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AUTOMOTIVE INDUSTRIES

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NEW YORK—THURSDAY, MAY 10, 1923

No. 19

THE FUTURE— WHAT DOES IT HOLD ?

Oft-repeated assertion that manufacture of motor vehicles will be concentrated in few hands does not seem justified. Lack of precedent obscures vision.

By James Dalton

WHAT is to be the future of the automotive industry?

In the face of an astounding business which has mounted until output has gone past the theoretical productive capacity, this question is being asked more and more frequently by men whose life work may be vitally affected by the answer.

To these seekers after the truth, the correct answer overshadows in importance immediate profits or even the solution of immediate problems to which they are dedicating their time. Always, in the backs of their heads, is the thought about the days to come.

It is only natural for men engaged in an industry with such a dramatic and spectacular history to ponder what the future holds. But arriving at a correct conclusion is a difficult task. There are no precedents from which to seek guidance, for the automobile has established its own precedents.

There seems too much of a tendency to accept immediate conditions as a premise, and jump at conclusions. The situation which now exists will not be permanent any more than the conditions which existed eighteen months ago were permanent. The industry has not yet been stabilized, and years may elapse before it is.

There is nothing definite even about the size of the future market, although every one admits it will be large. Eliminating the replacement market, which

will range from 2,000,000 up, the growth of demand for motor vehicles will depend largely upon:

1. Extent and rapidity of development of the highway system.
2. Markets in other countries.

Consideration now being given the future of the industry is not based so much, however, upon the probable market for its products as upon who will make them.

It is highly probable that if a questionnaire were submitted to the chief executives of the 35 or 40 largest companies in the passenger-car field and a somewhat smaller number in the truck branch of the industry, the replies would show that a majority of them believe:

THAT passenger-car production in future will be concentrated in the hands of a comparatively few companies.

That the truck output will be limited to an even smaller number of companies.

That there will be a heavy mortality in the parts and accessories field.

This view, which would not be unanimous by any means, would be based largely upon the contention that quantity output, with low production costs, will be essential for those companies which expect to survive in an era of keen competition. Reference would

ONE of the most perplexing problems for manufacturers in the automotive field, especially the men with relatively small production, is to chart the course of future events.

They hear on all sides the prediction that the day is not far off when large output and low production costs will be absolutely essential to success.

When this assertion is made too little consideration is given the fact that lower market-ing costs may offset higher material costs for the small producer.

This article is a discussion of some of the known and unknown factors in the situation with a conclusion which seems justified by logic.

be made to statistics which show that even now more than 90 per cent of the motor vehicles made are turned out by some fifty companies out of a total of about 400 factories.

The chief flaw in this reasoning is that quantity production will be essential to success. It has not been in other and older industries and is not likely to be in the automotive field.

EVER since the annual production of motor vehicles passed the six figure mark, a large proportion of them have been made by a comparatively few companies, and it would be highly surprising if such a condition did not always exist. But there have been many shifts among the leaders in the last ten years. All those at the top of the heap today are returning substantial profits, but not all of them have made money every year. There are a few which have had financial blows so serious they almost proved fatal, but they have recovered.

Some men in the industry go so far as to contend that some of the biggest and most successful "independents" of today will have to pool their resources if they are to compete successfully with the huge combinations which will confront them and which will offer dealers a complete line from the lowest to the highest price class, but their logic is not unassailable.

It is undeniable that manufacturing costs decrease in direct proportion as the quantity of production increases, but marketing costs increase as output expands, and many of the big companies are finding that it costs them as much to sell a car or truck as it does to make it.

Substantial economies can be effected by buying materials, parts and accessories in large quantities, but there is no evidence to prove that the loss resulting from purchasing in smaller quantities cannot be offset by perfectly practical economies in merchandising.

There have been a great many failures among automotive companies in the past, but they can be divided into three classes:

Those which were stock-jobbing propositions primarily and never really intended to go into production.

Those which had a legitimate product for which they could find no market.

Those which established themselves firmly but collapsed because they tried to expand too rapidly.

COMPANIES in the first class are entitled to no serious consideration. They have been parasites but they have not been peculiar to the automotive industry. Almost every line of endeavor has been afflicted with them and probably always will be. They seem just as inevitable in industry as fleas on a dog—and equally useless.

Companies in the second class also are encountered in all industries. Some man or group of men find that large profits are being made in a certain line, and they decide to go into that field. The decision may be hastened by presentation to them of a product which seems to be meritorious. If they lack such a product they engage engineers, perhaps, to design what they want, or think they want. Then they go into production but their efforts fall flat.

They may fail because their product is too much like that of some older company which has established a market or because they have overestimated public interest in what they have to sell. In any event, their efforts are legitimate even though unfortunate or ill-advised.

It is the fate of companies only in the third class which has any bearing on a consideration of the future. Given a meritorious product incorporating something tangible or intangible, not obtainable elsewhere in exact duplicate, for which the public really has a use, no serious difficulty will be encountered in finding a ready market.

TROUBLE comes to companies in this class after they have found their market. They fail, not because there is no demand for what they make but because there is too great a demand. They find sales are easy in their own immediate territory, and they reach out farther and farther for new markets. Before they are solidly on their feet they decide upon national distribution. They strive for increased production to take care of expanding sales. They may decide they need larger factory facilities. At some later stage they may conclude it would be cheaper to absorb some of their sources of supply.

Their financial resources were small at the beginning. They have not been in business long enough to demonstrate conclusively to bankers that success is assured. They strain their resources to meet the countless calls which are attendant upon expansion. Then comes collapse. It may be hastened by a period of depression but, except in rare cases, it is inevitable.

They fail, not because there is no market for their goods and no profit in them, but because they try to grow too fast. There is no lack of such sad cases in the industry today and there have been many of them in the past.

Failure was not due to lack of what might be considered quantity production, but rather to the attempt to get volume. When their markets were near at hand, selling costs were low and counterbalanced the higher prices they had to pay for their materials. If their expansion had been gradual it would have been sound and they might have survived. The trouble with many of the motor vehicle companies which have failed

has been that they went literally crazy in attempting to get national distribution.

NO convincing evidence can be found that the small automotive company is foredoomed to failure. On the other hand, there is plenty of substantial evidence that they can succeed if they are operated along sound lines. There are plenty of outstanding examples today of companies which are successful in a comparatively small way. At least two cases come to mind of companies which have firmly established themselves on a national basis in a few months, one in a small way and one in a large, because they had behind them experience, good judgment and resources ample to their needs, plus a meritorious product.

Failures in the automotive industry have been and will continue to be the result of human rather than economic causes. The trouble has been that too little consideration has been given to economic laws which existed long before the automobile was born. The fundamentals of success are much the same in any industry, and they cannot be ignored with impunity.

It is not surprising, nevertheless, that there is so much speculation about the future. The automotive industry has had no mother to guide it, and has "just grown," like Topsy. In the whole industrial field there is nothing with which to compare it. It has sold direct to the public, for the first time in the history of the world, a complicated piece of machinery. The tremendous problem of servicing has been worked out step by step, and it has been done remarkably well considering the difficulties in the way. The same is true of all the other obstacles it has surmounted. In engineering it has blazed a trail of which it should be everlastingly proud, and it discovered quantity production for machinery.

Other major industries, however, have behind them the experience of many decades. They have become practically stabilized in production and merchandising methods. They have ridden over the hills and valleys of many booms and periods of depression. They have accumulated enormous masses of data and statistics. When they undertake analyses of any kind in an effort to look into the future they have something to analyze. They know that nothing is likely to happen in the future which has not happened at least once in the past. They are thoroughly familiar with long swings and short swings. They have in them many companies which have grown gray in the business. They have established banking and financing traditions. They know pretty well what to expect, when to expect it and how to prepare for it. They have been through so many crises they should be able to read the portents from afar.

The automotive industry lacks most of these aids to vision, and has to grope its way ahead as best it can, although it has done a mighty good job of groping up to this time.

THE systematic compilation of production statistics was begun only four or five years ago in the passenger-car field and it has scarcely been started in relation to trucks. No one knows the extent of the replacement market because no accurate data are obtainable on the average life of the various makes of vehicles. Some of the first ones made haven't worn out yet. The potential market is almost as much of a mystery. The industry never has had what can be classified truthfully as a normal year. It has had fat years and lean years but nothing which can be recognized as an average year.

With all these factors of uncertainty it would be amazing if the industry were not speculating about

its future. If it weren't it would be stupid, and even the railroads don't accuse motor vehicle manufacturers of stupidity.

Only experience can tell what the future will bring. Even the experience of the immediate future may be no criterion of the ultimate future. There is much talk of survival of the fittest, and that is a perfectly good economic law. It may be true that some companies have survived up to this time which haven't deserved to survive. And it may be true that some have died which should have lived, but investigation probably would disclose that somebody in the organization erred. A post-mortem is not as difficult as an accurate diagnosis while the patient is alive.

Many persons are predicting consolidations and combinations on the theory that only those companies which attain huge production can last. Even if that proved to be true in the next few years, which we don't believe it will, there might later be a complete reversion to present conditions.

Attempts have been made to compare the automotive industry with other industries in the earlier stages of their development but such speculations prove nothing for there is nothing with which the motor vehicle is comparable.

SOME economists predict that the automotive industry will run the same course as the iron and steel industry, which underwent a regular orgy of consolidations about the time the automobile was being born. But the biggest of the steel combines, after many successful years, has not a monopoly of the business. There are many independents, big and little, which have pursued the even tenor of their way, paying substantial dividends year by year. The number of successful small steel companies in the field is really amazing.

In the last analysis the future of the automotive industry will be determined by the public which buys its products. Even economic laws are based on mass psychology. Americans are more individualistic than any race on earth. They positively refuse to be standardized in their likes and dislikes. They object to being bossed.

Ninety per cent of the public may go on buying its motor cars from fifteen or twenty companies, but the other 10 per cent is going to insist on having its individual wants and whims supplied. This approximate 10 per cent of the potential purchasers want something different, and they're going to get it if they have to make it themselves.

Estimating a normal year's production at 2,500,000, which is as good a guess as any for the next few years, the 10 per cent of the public which will insist on "something different," will take 250,000 vehicles. Estimating the average price per unit at \$2,500 gives a total annual business of \$625,000,000, which makes a pretty respectable industry in itself.

Basing future action on crystal gazing is a hazardous undertaking, but treating fundamental facts with logic often is profitable. We do not believe the time ever will come when the production of motor vehicles will be exclusively in the hands of a few companies. Small companies in the field today can succeed if they operate on sound business principles and keep their marketing costs down to a minimum. New companies which come into the field will have an equal chance of success.

We do not believe Americans ever will permit complete control of individual transportation to pass into the hands of a few manufacturers.

Lower Production and Selling Costs Needed to Maintain Prosperity

Is warning sounded at National Foreign Trade Council meeting. Export orders deemed essential to take up slack in domestic market during latter part of year. Service and maintenance stressed. General world economic trend shown to be upward.

By George E. Quisenberry

A WARNING to American business men that redoubled efforts to reduce manufacturing and selling costs are essential to the continuation of the present period of prosperity was sounded at the annual convention of the National Foreign Trade Council at New Orleans last week.

"American orders at home are being obtained without very much effort, and in many cases at high prices," declared Edward N. Hurley, chairman of the board of the Hurley Machine Co. of Chicago, in speaking before one of the general sessions of the convention. "These high prices on domestic orders frequently create indifference toward foreign trade, which is seriously affecting the development of our merchant marine and our country at a period when we need exports to balance our increasing imports."

"I believe in the ability of the American business man, but I do not think he is putting forth that effort to reduce the cost of manufacturing and selling his wares which he is capable of doing. What might be termed post-war necessity is now being ignored by most of us."

"A reduction in costs of manufacturing and the employment of every inch of floor space in every factory were never so much needed. Some concerns, through a combination of circumstances, have been able to make profits without doing this. They must, however, soon fall into line. Industrial building should be kept at a minimum; let the employees do the building, so that they may have their own homes—another feature of real prosperity."

Management Needs Readjustment

Hurley probably did not have the automotive industry specifically in mind, but his meaning, nevertheless, should be carefully weighed by those who plan and carry out the financial, production and merchandising policies of the industry.

"War and war profits retarded the progress and natural development of our country," he stated. "There must be a readjustment. While many of us urge the readjustment of labor as a remedy, management must also be readjusted to meet new conditions. Labor can become more efficient—so can management. Unless we improve our methods so as to increase our profits by lowering our costs of manufacturing and selling, and increase our volume by selling a reasonable percentage of our total sales to foreign customers at fair prices, we are not working on a sound basis. Now is emphatically the time to avoid the errors of 1920—to keep a sane attitude toward industry—to be satisfied with a production schedule that fairly meets the demand, but falls short of over-production—and to increase profits not by increasing prices but

by reducing costs of the business we are already enjoying."

The keynote of the convention was planned to center about a consideration of European conditions as relating to world trade, and this keynote was carried into many of the formal speeches and addresses. But running through the convention, both in the general and group sessions, and among the discussions of the delegates as they met in the hotels or over their meals, was the theme of production, and the outlook for the remainder of the year, with the related factor of foreign trade.

"Stabilization of Production"

What may be termed, as one speaker had it, "the stabilization of production," so that the latter half of this year may not see any great falling off in output and commercial progress, was keenly before the automotive representatives. They sense, as has been shown previously, that a backlog of foreign orders is essential in the months to come if schedules are to be held up, and if the factories are to be kept operating at normal levels of output.

The automotive representatives—and, unfortunately, the number was smaller at New Orleans than has been the case at other conventions of the council—look upon foreign markets as offering a steadily increasing demand. Already this is reflected on the order books and shipments of many companies, but, it was stated, domestic demand is preventing many executives from comprehending the expanding aspect of this part of their sales.

With the expected diminution in home markets which certainly will follow the peak of the summer, these overseas shipments will be a more significant part of the general business. Export representatives look with rosy spectacles upon the rising demand from Latin-America, Australia and other sections, which, they believe, assure them of a satisfactory volume clear into 1924 and for many years to come. They expect to contribute an important quota to the factory schedules so that there may be, in effect, a "stabilization of production" which has not been normal throughout the industry.

Numerous group sessions were held during the convention, at which such subjects as credits, foreign advertising, financing and related subjects were discussed.

One subject brought up was the relation of price and overhead to the development of foreign business. Service rather than price was given by O. O. Gallup of the Simonds Saw & Steel Co. of New York as the more important factor in building overseas sales, and this met with rather general agreement by the automotive representatives, who, of course, are stressing service and maintenance

abroad, just as is being done at home. On the other hand, representation of many of the tire companies selling in the foreign field, declared that price has become of the greatest importance in their overseas business. This, perhaps, is a temporary condition, caused by recent advances. Every effort must be made, it was stated, to keep prices to the lowest possible levels.

A picture of economic conditions throughout most parts of the world was given by C. C. Martin of the National Paper and Type Co. of New York. Based on credit and financial information, improving tendencies were found generally by him, although his characterization of the business outlook in the United States was less optimistic.

"Activity in the United States is disconcerting and conservative observers are fearful that the present movement may get beyond control," he declared. "Increasing prices in this country are giving foreign and domestic traders uneasy moments."

In other sections of the world, excluding Europe and certain limited sections elsewhere, the economic trend was shown to be upward. A summary of the report gives the following:

"Canadian conditions show marked improvement, with a favorable trade balance in 1922 of \$132,000,000. Crops are abundant and textile, paper, lumber, mineral and metal trades are steadily improving. It is predicted that specie payments will soon be resumed. A good sugar crop, with rising prices, promises well for Cuba. Mexican conditions are characterized by a psychological state of uncertainty, proceeding from a lack of definite opinion regarding agrarian, oil and labor legislation. A slow acceleration of activity is visible, but there is no evidence of rapid improvement."

Central America Gaining

Guatemala, Honduras and Salvador were said not yet to have climbed out of the depression period, but other sections of Central America, which include Nicaragua, Costa Rica and Panama, were in a much better commercial position, due largely to crop movements.

"Colombian conditions have progressed substantially," he stated. "The Venezuelan finance policy has been exemplary and conditions are better, with prices and demand for principal crops good. Oil prospecting is making great strides, and wells recently brought in are large producers. Ecuador is turning out good crops at rising prices. Increased prices are being received for Peruvian sugar, cotton, copper and wool. Bolivia sends news of a vigorous tin market, firm prices and activity in copper."

"Chilean business conditions show improvement. Exchange is higher and nitrate stocks at home and abroad have been reduced, shipments exceeding production. Optimism characterizes the news from the Argentine. Prediction is for par of exchange in 1923."

"The Brazilian trade balance is favorable, but exchange is unfavorable. Crop reports are good, coffee exports increasing, and the new government plans drastic financial reforms. Uruguayan exchange reflects changes in that of Argentina, but more complete dependence on the meat industry has made recovery difficult."

"Across the Atlantic, we find the center of economic infection, but there are bright spots. Particularly stimulating is the example of Great Britain."

Martin, after reviewing the improved conditions in England, showed that depression still existed in Holland, Belgium, France, Spain, Switzerland, Czechoslovakia and Italy, although in each of these countries he found much that was hopeful.

"Germany is paying the price of her economic sins, and apparent prosperity is giving place to serious financial

and business difficulty. German economists are fearful that Germany's day as a great nation has ended."

That a stabilized Europe is essential to the prosperity of the United States was featured in the report of the council on European conditions, which was given by O. K. Davis, the general secretary. The report, which was made public the same day on which the latest German reparation offer was recorded in the newspapers, suggests a total sum of 50,000,000,000 gold marks (approximately \$12,500,000,000) as the amount that might properly be expected by the Allies. The German reparations offer aggregated 30,000,000,000 gold marks (\$7,500,000).

Enlargement and expansion of the consumptive power of the European and other countries as a necessary postulate to large expansion in world trade, was stressed in a number of the addresses. J. H. Tregoe, secretary of the National Association of Credit Men of New York, declared that the immense wealth and the unrivalled gold holdings of the United States should be employed to this end.

Use of American Shipping Urged

A plea for wider use of American ships by exporters of this country was made by James A. Farrell, president of the United States Steel Corp. and chairman of the council, in his address before the convention. He gave this as being the best subsidy which could be accorded to the merchant marine.

Farrell also declared himself in favor of private ownership of Shipping Board vessels, the total of which was estimated at 7,169,717 tons. He also suggested cooperation with foreign lines now competing with American ships to the end that cargoes might be obtained on both outward and inward voyages, and that "unbusinesslike competition" might be overcome. His address was followed by the adoption by the council of a "declaration of principles" favoring ship sales to private owners and operating companies.

A paper prepared by J. D. Mooney and L. H. Kurtz, president and director of advertising of the General Motors Export Co., was read at the advertising group session. The paper outlined the consumer advertising policy of the company.

Among the convention delegates were B. G. Budd, general manager of the Packard Motors Export Corp. of New York, and D. L. Brown, export advertising manager of the Goodyear Tire & Rubber Co. of Akron. Budd was at New Orleans following a trip to Cuba, and Brown following a visit to Mexico. In the former territory the Packard representatives found steadily improving sales, resulting from the high prices for sugar and the good condition in the tobacco crop.

Mexican Dealers Optimistic

Dealers in Mexico have been greatly elated, Brown stated, over the prospects for recognition, which is confidently expected in Mexico City. A continuation and slow expansion is anticipated, he said, the present important need being the development of motor highways and rural transportation.

An effort is being made to hold the 1924 convention of the council at Detroit and representatives of the Detroit Chamber of Commerce, as well as all the automotive representatives at New Orleans, were prepared to go before the council and ask that the Michigan city be chosen for next year. St. Louis and Boston were also prepared to ask for next year's meeting, but the council determined to hold over the selection for the executive committee, which will meet this summer or fall. Efforts will be made to enlist active support from executives of the industry prior to this committee meeting.

Specially Designed Engines Required for Commercial Airplanes

**Military power plants are
not suitable for business;
operating costs important.**

By Archibald Black

THE commercial airplane presents requirements which generally cannot be met by engines designed for military use, and special commercial engines may be regarded as a logical development of the immediate future. Thus we will soon have three types of aircraft engines: Airship, commercial airplane and military airplane.

Military requirements will call for some variations in accordance with the characteristics of the airplanes in which they are to be installed and, although not generally the case, it will sometimes be possible to develop a type which is adapted to a certain branch of military work, and which is also suitable for commercial use. Engines for some types of night bombing airplanes represent probably the nearest approach to commercial requirements but,

THIS article outlines in detail the kind of engine needed for commercial flying. The author says frankly that engines built for military use do not meet business requirements.

Maintenance and operating costs must be cut to a minimum if an airplane is to be operated at a profit.

even in this case, it will be found quite difficult to reconcile the conflicting requirements.

In the accompanying table are listed the various conflicting requirements of the two types of airplane engines as considered in a rather general manner. Some of these are such that the requirement of one class is more than met while meeting that of the other, but it will be found that the necessity of balancing one gain against another usually nullifies this advantage.

The questions of paramount importance in commercial airplane engine design are those of cost, not merely the initial cost, but also all items such as useful life, period between overhauls, time out of service for repairs, and others which have some bearing upon maintenance expense.

It should be clearly understood that maintenance cost must be figured to include interest on the engine investment while the unit is out of service, and that (while airline operation remains a highly speculative investment) a rate of about 15 per cent per annum should be allowed. Thus, with an engine of about 500 to 600 hp. costing nearly \$10,000, as at present, it will cost about \$28.85 per week to merely hold it out of service exclusive of the cost of repairs, storage or insurance. The insurance will cost about \$4.80 additional, making a total weekly charge of \$33.65 without the cost of storage or repairs. To put it in other words, we might say that an idle engine costs almost as much as an idle mechanic.

Time in the shop is an element which cannot be ignored even though it may seem far removed from the engine manufacturer or designer. Thus the accessibility of all parts, and the facility with which repairs can be made, should be kept in mind throughout the entire design of the engine.

It should be possible to grind valves, examine main bearings, etc., with the minimum amount of disassembling, and certainly without tearing down the engine. Component parts should be designed so that they may be removed as units and replaced by other units which have been previously overhauled, so that

Comparative Requirements of Commercial and Military Airplane Engines

Feature	Requirement or Importance of Feature	
	Commercial Engines	Military Engines
Initial cost	Lowest possible	Secondary importance
Maintenance cost	Lowest possible	Secondary importance
Life	Longest possible	Secondary importance
Weight	Not over 2.5 lb./hp.	Absolute minimum
Horsepower output	400 and 600 units, or a single unit of 500; possibly 1000 later	100, 150, 200, 400, 600 and 1000 units
Propeller r.p.m.	1200 to 1500	1600 to 2000
Projected area	Unimportant	Minimum
Dimensions	Unimportant	Minimum
Connections broken when removing	Absolute minimum	Of minor importance
Accessibility	Maximum possible	Advantageous but of minor importance
Reliability	Maximum at about 75-85 per cent power	Maximum at full power
Safety	Maximum possible	Secondary importance
Altitude performance ...	Good at 2000 to 8000 ft..	Variable. Usually good above 15,000 feet
Simplicity	Maximum possible	Secondary importance
Muffling	Important	Unimportant
Time out of service for repairs	Absolute minimum	Secondary importance
Period without overhauls.	Maximum	Secondary importance
Gasoline and oil consumption	Economy at 75-85 per cent power output....	Economy at full power
Power take-offs	Electric generator; perhaps fuel pump	Gun synchronizer; fuel pump

the whole engine is not tied up while some parts are being cleaned, repaired or adjusted. Interchangeability of all parts, down to the smallest, should be rigidly adhered to in order that any part or unit may be immediately replaced from stock. The part removed can then be cleaned or repaired at leisure and placed in stock for use in succeeding overhauls of other engines.

It seems quite likely that the practice of designing the power plant installation to be removable as a unit will increase in popularity, but this should not be allowed to retard the making of all engine parts as accessible as possible. The chief advantage of the removable unit power plant is that it reduces the time which the airplane is held out of service through engine troubles.

Accessibility of engine parts is just as necessary as with other forms of installation, in order that the cost of engine repairs and the time which the engine is out of service may be kept down.

Quick Engine Replacement Sought

Airplane and engine each represent important items in the airline investment, and neither should be kept out of service one hour more than is necessary. In order that the time required for removal and replacement of engines may be reduced to the minimum, the engine designer should endeavor to bring all of the controls to some one or two convenient points at the end remote from the propeller. The connections should be quick-detachable so that these controls can be readily broken or made up, and they should be of some type which is positively locked

when made up. The holding-down bolts should be limited in number and the engine should be provided with some convenient attachment for a lifting tackle.

This lifting tackle provision should be arranged so that the engine can be balanced either when being lifted alone or with the radiator and propeller attached. Each condition will be encountered in service. If two attachments are provided, one well on each side of the line of center of gravity of the engine, every condition can be met by the use of a properly proportioned sling. The attachments should be so located that the sling used will not bear against any parts of the engine which may be damaged thereby. It should be possible to either slide the engine forward or to lift it directly upwards, no parts being allowed to project so as to interfere with its removal in one manner or the other.

Although some airplane engine designers may hold up their hands in horror at the suggestion, there is no reason why it should not be possible to remove the entire power plant in five minutes and replace it with another, ready to run, in 10 minutes more if the occasion demands. This will often eliminate the necessity of holding a reserve airplane, and it is for just such emergencies that the commercial airplane and engine must be designed. The reduction in investment made possible by this system is of very great importance and 15-minute emergency replacement of the power plant unit should be the goal of the designer.

Military requirements call for a great variety of different sizes of engines from the viewpoint of power out-

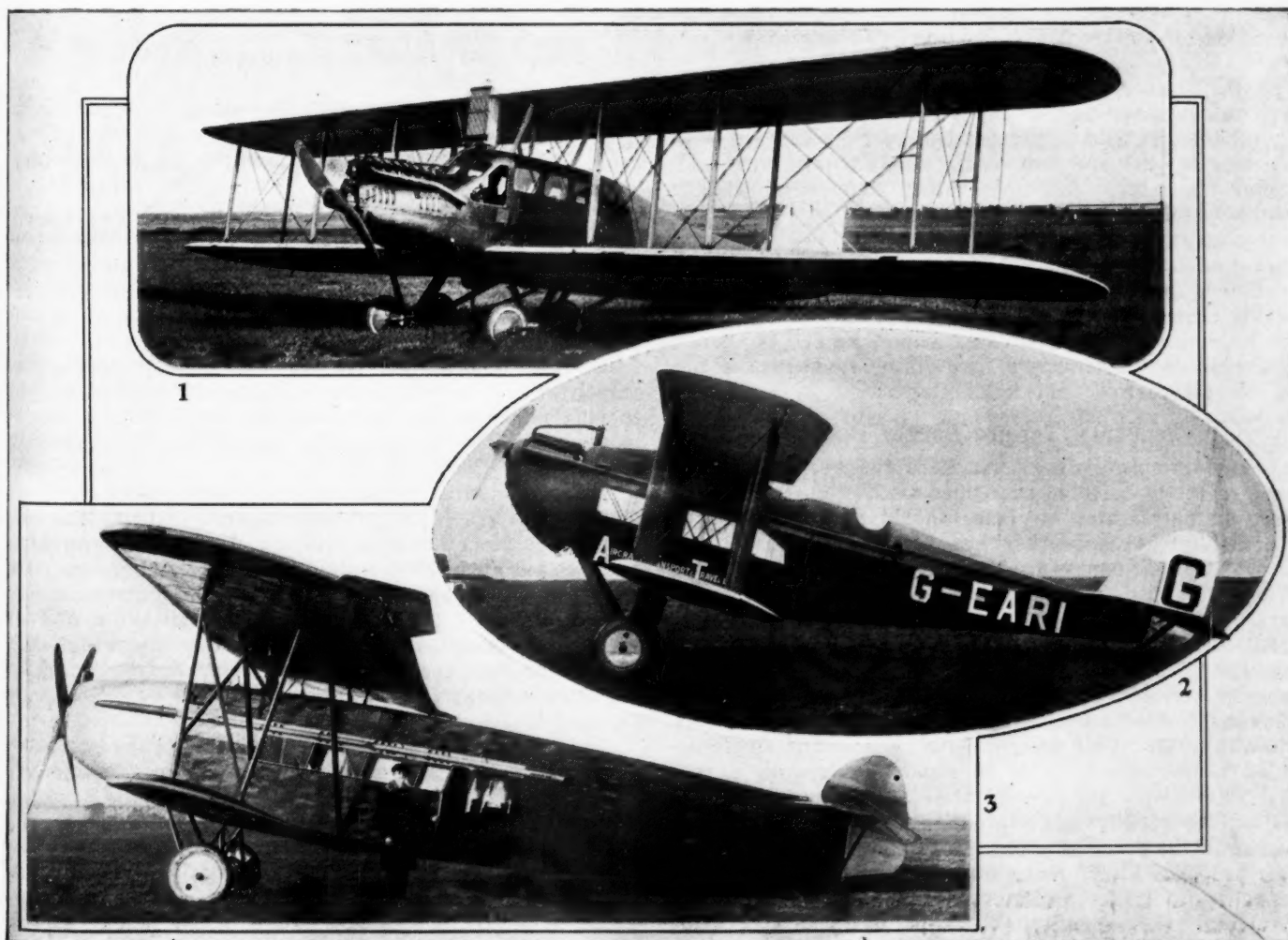


Fig. 1—Liberty 12 engine installed in the Curtiss "Eagle." Fig. 2—The DH-18, one of the earlier post-war developments used extensively. Fig. 3—Fokker 10-passenger commercial airplane, a late development using the Rolls-Royce 360-hp. engine. (Note the large size of the body.)

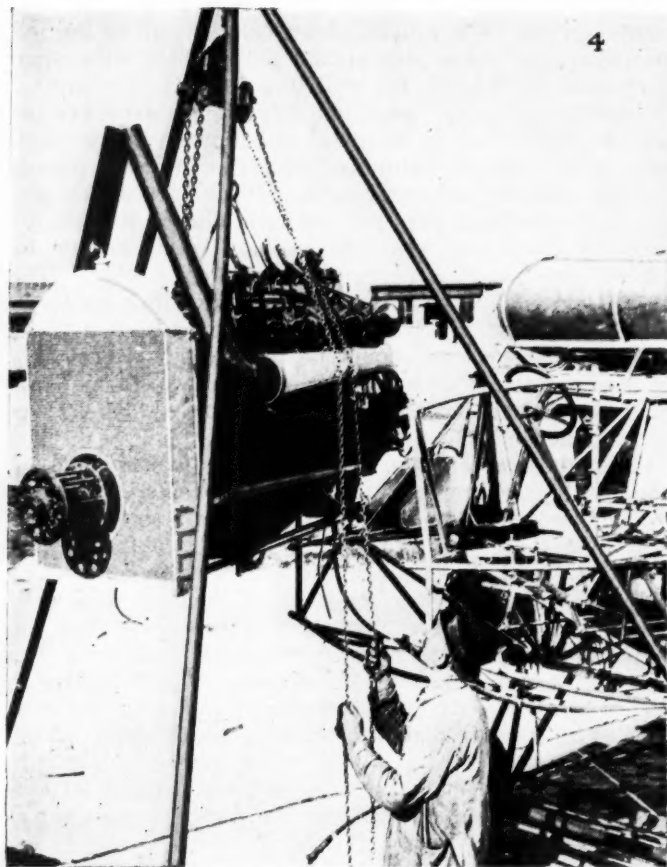


Fig. 4—Fokker F-5 showing the quickly removable power unit



Fig. 5—Hinged powerplant installation used in a small Bristol machine. (Courtesy of Aerial Age)

put, ranking from 100 to 1000 b.h.p. On the other hand, the commercial field at present can be fully covered with two models, 400 and 600 b.h.p., and possibly with only one of 500 b.h.p. Although future commercial designs are likely to call for 1000 hp. engines in some cases, the engine manufacturer who contemplates giving special consideration to the commercial field will be safe in making the 500 hp. size his only model.

This size is a little more generally suitable than the 400 hp., might be used in cases where the 600 hp. would otherwise be called for, and is certain to continue in use for several years if not indefinitely.

Tendency Toward Larger Bodies

I have completely neglected here the question of the small privately operated passenger machines. These small three or four seater airplanes should not be classed as "commercial" because they are suited only for private flying. An airplane suitable for commercial operation, as a general rule, should be able to carry at least eight passengers or 1500 lb. of packages.

All commercial airplanes have bodies of very large cross section, this being necessary to provide the cubic capacity for passengers or freight. These bodies will be increased rather than decreased in size in new designs. Practically all recent designs have been of the single engined tractor type, and it is becoming generally agreed that this is—for the present at least—the most suitable. As will be readily appreciated, the mounting of a small engine in the front of a very large body creates considerable propeller interference, and makes it desirable to use propellers of larger diameters than are used for military airplanes. Consequently, the engine designed specifically for commercial installations should be capable of delivering its maximum horsepower at considerably lower r.p.m. than customary with military engines. It is desirable to

keep the maximum propeller speed down to 1200, or, at most, 1500 r.p.m., for 400 to 600 horsepower engines as compared with a speed of 1700 to 2000 r.p.m. for military engines of the same size.

This object may be attained either by lower crankshaft speed or by gearing down, but the former is very much to be preferred if it can be accomplished without serious increase in weight. Weight is important in commercial engines, but it is not of such vital importance as in the case of military types. Present military engines range from 1.68 to about 2.7 lb. per horsepower, varying inversely with the horsepower. Commercial engines of 400 to 600 b.h.p. should not exceed about 2.5 lb. per horsepower, and 2.25 lb. might be regarded as a desirable weight.

The projected area and overall dimensions of commercial engines are of minor importance. In fact, they are of no importance in the case of land types where the large bodies used always leave ample room for the engine. Of course, excessive frontal area would be somewhat objectionable in the case of flying boat installations, and in cases where engines were mounted out on the wings, but the engine designer need not feel compelled to cramp to the same extent as in military work.

Simplicity of Great Importance

In the installation of commercial engines, simplicity is of very great importance. Gravity gasoline systems, using only one large tank, appear to be preferred by the most experienced designers of commercial craft. However, it is always well for the engine designer to consider the possibility of being required to provide such accessories as engine driven fuel pumps or air pumps, and to arrange some provision for attaching these in event of their being called for in the specifications. Attachments for electric generators for lighting should be provided on

commercial engines as these undoubtedly will be used in preference to the wind driven type common in military work. The extensive night flying of the near future will call for sufficient power to supply such items as cabin lights, wing tip searchlights (for landing) and radio. Some compression release is also a desirable provision.

The commercial engine will ordinarily be flown at altitudes of about 2000 to 8000 ft. and slightly throttled, delivering possibly 75 to 85 per cent of its full power. Accordingly, the aim of the designer should be to provide economy of gasoline and oil under these conditions, and absolutely the greatest possible reliability.

In comparison with this, the majority of military engines are called upon to deliver maximum power with great reliability at altitudes usually over 15,000 ft. and sometimes very much higher.

Freedom from all hazards, such as that of fire, is of vital importance in commercial designs, while for military purposes this would be classed only as an important advantage. The provision of some means of muffling is very desirable in commercial installations, and will undoubtedly become an essential feature of these soon. This point, however, is usually best left to the airplane designer, as it cannot be considered apart from the installation. The engine designer's part of this work lies in the elimination, so far as possible, of other noises, such as that of reduction gears. Some type of engine starter should be regarded as an essential, but it is yet too early to say whether the hand crank or the mechanical types are most satisfactory. Generally, the starter may be of the same type as used for military engines.

Potential Market Large

The designer of commercial engines should consider that the operators will regrind cylinders twice and crankshaft main bearings and throws once during their life. This is not yet the general practice, but it has been tried out successfully, and is practically certain to become universally adopted in the near future. Consequently, it may be desirable to allow a slight excess of metal on these parts.

The engine manufacturer who reads these notes will probably raise the question of why he should give this field any considerable attention until a substantial market is ready. It is certainly true that the field in this country is very limited and is seriously affected by the fact that surplus Liberty-12 engines are still available. At the same time it is the biggest potential aircraft engine market outside of Government purchases, and is bound to develop within the next few years.

Commercial Development Needs

Most commercial operators are using unsuitable engines because they are yet the only ones available and war surplus stocks make their cost only a fraction of their value. Neither condition is permanent, and the engine manufacturers should consider that the first to develop a real commercial engine will have an exclusive field for a time. One American manufacturer of engines is actually working on a special commercial modification at this moment.

It is very probable that the reduced cost of maintenance of a real commercial design would be more than enough to offset the competition of war surplus engines. For example, if the commercial design costs nearly the same to maintain, but has twice the life, it can compete directly with war surplus models sold at half of its price. Indeed, it seems quite possible to develop commercial engines with such low maintenance costs and long life that they can be sold in direct competition with surplus engines at two to four times the price of the latter. With Liberty-12 engines available at about \$2500, commercial engines of 400 to 600 b.hp., could then be sold for \$5,000 to \$10,000.

Even at this price the operator would prefer the new engines because of the difficulty in getting Liberty parts and the uncertainty as to future supplies of surplus engines. As Europe is no further ahead in the development of commercial airplane engines than the United States, a real commercial engine of possibly 500 b.hp., will have a world market at the start.

New Rotary Valve Has Novel Method of Packing

A DESIGN of rotary valve for internal combustion engines, known as the Rotovalve, has been developed by the Goby Patents Co. It is of the type which, in a multi-cylinder engine, extends across the heads of the cylinders and through a slot in its side places a port in the cylinder head in communication alternately with the inlet and exhaust ports.

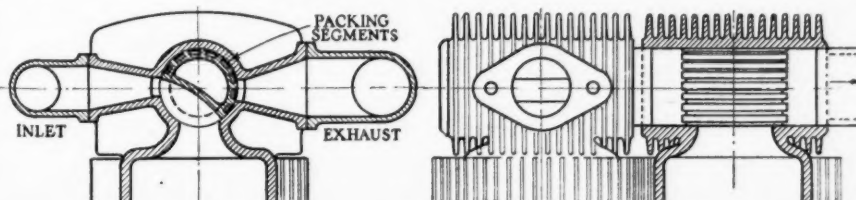
The novel features reside in the method of packing. It is necessary to give the valve considerable clearance in its tunnel, and it would not be possible to depend upon the fit of the valve itself for gas tightness. In fact, the valve has to be sealed against leakage both longitudinally and circumferentially.

In order to prevent circumferential leakage, the valve is provided with a series of packing bars snugly fitting into longitudinal grooves and pressed against the wall of the

valve tunnel by two narrow split rings of the ordinary type.

At the ends of this bar packing there is a packing designed to form a seal against longitudinal leakage. This consists of a ring of metallic composition which is also expanded by split rings, and it is claimed that, owing to the plastic nature of the composition it conforms readily to the surface of the valve tunnel and the ends and sides of the packing bars, thus making a very effective seal. The whole packing arrangement is free to expand and contract in conformity with temperature changes.

As will be seen from the illustrations, the valve is a hollow casting, and it is intended in air cooled engines to circulate some of the cooling air through it. In water cooled engines some of the air moved by the radiator fan would pass through the valve, but in the case of engines designed for operation at extremely high speed, and under high duty it would be possible to circulate cooling water through the valve. Owing to the fact that the exhaust gases and the fresh charge pass through the same passage in the valve, there is a natural cooling effect. The valve is driven from the crankshaft by means of a silent chain. Tests have shown a very satisfactory power output.



Cross section and cutaway view of air-cooled cylinder head with Goby valve

Just Among Ourselves

DETROIT is one of those celebrated hives of industry. It's busier than the well-known bee or the equally well-known one-armed paper hanger with the hives. If there's any male in the city who isn't working he's blind, an invalid, a cripple or a bum. The "automobile millionaires," and there's lots of them, work harder than anyone else. Some of them punch time clocks and all are at their desks promptly at 9 a.m. Few leave until long after the clock strikes five. The golf season isn't really under way, however.

EVEN with automotive executives tearing their hair to get the materials they must have to keep their plants driving at capacity, they're thinking about the future more than they ever did before. They're intensely interested in practical economics, service, sales analysis, production economies, design and refinements in construction. They know that the days to come will bring fierce competition and they're determined to be ready for it.

THAT question of service looms large on the horizon of Detroit. "Many sell service but few give it," one man said the other day. Almost every one is coming to the flat rate system. Not only are they going to fix fair prices for every conceivable operation but they're going to see that the service stations give value received for the flat rate. Persistent offenders will be supplanted with dealers who know what service means both to them and the factories. They are coming to realize that repeat orders mean bread and butter and that

inability to get them means ultimate failure.

THE Packard Motor Car Co. is making a really scientific study of the service question from the engineering angle. One man in the engineering department devotes all his time to service in cooperation with another engineer attached to the service department. Weekly conferences are held at the Detroit branch to study recurring maintenance problems and the data resulting from this and other surveys which are constantly under way are applied to design problems. Such study cannot fail to produce important results. It is a long step in the right direction.

SALES executives of big production companies have some rather definite ideas on the subject of exclusive dealerships. They believe that concentration on one line gives a greater chance of success, although they admit that the dealer in the small town who has only a limited territory may have a tough time. At least one company which has been unable to make output keep pace with demand is gradually reducing the number of dealers and giving those who remain larger territories. If a dealer has enough sales prospects in his field to insure a reasonable volume of business, this company feels it is justified in demanding exclusive representation.

DETROIT manufacturers profess to believe that their dealers have the used car problem pretty well licked. Each seems to think that his own par-

ticular sales organization is paying no more than it should for used cars and that it is selling them at a price which will prevent a loss. They probably are unduly optimistic on this subject but encouragement for the dealer can be found in acceptance of the principle that sales should not be forced on dealers when they are loaded with second hand merchandise or when the demand for new products falls off. The temptation to depart from this theory will become stronger, however, when there is an actual decline in retail sales.

TERRITORIAL sales analyses by practically all companies are much more scientific than they once were. Arbitrary methods once employed are going into the discard in spite of the present tremendous demand. There is much more quality to the advertising, too. Notwithstanding the technical faults it may have had it has sold the automobile to the United States so that every family wants at least one. It is improving technically month by month and this improvement extends to the dealer advertising, also.

THE industry has become accustomed to reports of capacity production from passenger car plants but it is a new story in the truck field. It warms the cockles of the heart to hear commercial vehicle makers sobbing bitterly because they can't get the materials they need to meet their orders. Every truck company of any standing has more business than it can handle. Farmers are becoming eager buyers of the smaller capacities but there is a mighty good demand for heavy vehicles. The

More or Less Pertinent Comment on Topics of Current Interest to Men in the Industry

boom in building has helped it along.

DIRECTORS of one big Detroit truck company had a meeting recently to hear about the earnings for the first quarter. They had heard so much about the rising cost of materials that they were wondering whether there would be any profits. Much to their amazement they learned that their company had made as much in the first quarter as it did all of last year and thirty times as much as in the corresponding period of 1922. Not only that, but it has \$1,200,000 in cash. The management did it by keeping down overhead and eliminating leaks.

NOTWITHSTANDING the present demand for the heavy duty truck, there is a growing feeling in Detroit that it will gradually disappear from streets and highways. The general manager of one of the biggest parts companies says there is a real need for only two models, one light and the other not exceeding 2½ tons. He believes anything heavier than that will be legislated off the highways before long. Big production will be essential to success in future, he contends, and variety of models does not lend itself to large output.

FORD production now has definitely approximated 6500 cars a day but orders are running about 1000 a day in excess of output. If this pace can be maintained it will mean more than 2,000,000 sales a year. Sales executives are rather excited about the success of the Christmas savings plan. They are convinced it will tap a new sales field and that when it is once

under way it will bring in a steady flood of orders from persons who otherwise would not be able to own an automobile. As they tell the story it sounds plausible.

CONSIDERABLE speculation is heard about Ford's plan for the future in view of the unusual size of the branch plants which are projected, especially at St. Paul and St. Louis. It is believed in some quarters that he must contemplate fabrication at the larger of these branches in addition to assembly, because it does not seem possible that he can continue to turn out a constantly increasing number of complete vehicles at his Highland Park plant, in addition to the enormous quantities of parts which must be produced there to keep the branches busy.

THERE are those who contend that Ford ultimately will concentrate his manufacturing operations at the River Rouge where his blast furnaces and other units now are located. This location provides plenty of room for expansion. His laboratory will remain at Dearborn, however, and a fine new building is being erected there for experimentation, development and research. No one doubts that he will have to bring out a new model passenger car sooner or later. Tests of his 2-3 ton truck have been completed, but it is understood that it will not go into production this year.

AN amazing production record is being established by the Chevrolet Motor Co., which is not yet getting the full advantage of its recent expansion program. The output for the first quarter aggregated 95,000, and unless

there is an unexpected decline in sales the output for the year will be well in excess of 400,000. Excluding Ford, this will break all previous records for a single company. Chevrolet executives are enthusiastic over the success of the great advertising campaign now under way. It was a somewhat daring venture, but it has been vindicated by the results.

"WHERE are they all going?" is the question usually propounded when the amazing motor vehicle production of the last year is mentioned. No one has been found who professes to be able to answer the question. The fact remains that they are "going" into every section of the country. More and more are being sold on the farms, and some sales managers profess to believe that sales in agricultural territories the coming fall will offset any decline in industrial districts. If a county map of the United States were placed on a table it would be hard to find a spot where retail sales aren't good.

DETROIT makes more automobiles than all the rest of the world combined but after roaming about the streets for a while you wonder that there are any left for export after domestic demand is supplied. The automobile population in the streets is dense and every vacant lot is filled with used cars for sale on time. The miracle of it all is that any pedestrians escape sudden and violent death. A careful driver in Detroit would be considered a maniac in the traffic of any other city. They kill only two or three a day, at that. Those who have to walk must be good dodgers. At any rate they work to close tolerances.

J. D.

First Step in Accident Prevention Is Study of Causes

More analytical work needed before legislative measures are adopted. Survey conducted in New York City shows greatest loss of life among school children. Death and injury rate not increasing as fast as number of motor vehicles in operation.

By Philip H. Smith

THE problem which presents itself to the individual interested in the welfare of the automotive industry is that of reducing still further the number of accidents while putting more cars on the road. Experience gained by motor vehicle drivers tends to improve the situation while increasing road congestion tends to make it worse.

Before legislative action is taken there should be every effort made to analyze the subject and find out the exact causes of accidents. If this is not done there is danger that the measures will not be just to all parties and will only have to be revised as more light is cast on the matter.

The New York Police Department's Bureau of Public Safety has recently undertaken a study of traffic to determine the principal causes of accidents. So far this study reveals two facts of outstanding importance. One is that the greatest number of fatalities are among persons between the ages of six and fifteen; the other, that there is an exceptionally heavy toll of lives due to persons crossing the streets at places other than the regular crossings.

This traffic study proves conclusively that if pedestrians refrained from taking chances and stopped the practice of "jay walking" one of the principal causes of accidents would be eliminated, and we might expect to see a sharp drop in the number of fatalities and injuries. Whenever possible the blame for accidents is fixed by the department, and their records show the pedestrian to be at fault in the majority of cases. It remains to bring home this fact to the public.

A tabulated form of the report of the Bureau for the first quarter of 1923 follows.

Cause	Number Killed	Number Injured
Crossing at crossing—		
Vehicle turning corner .....	..	33
Vehicle passing street car while discharging passengers .....	..	9
Person coming into vehicle path behind street car .....	..	32
View obstructed by umbrella .....	..	17
Vehicle starting too quickly on traffic signal .....	..	2
Crossing not at crossing	54	1,247
Stealing rides	2	36
Coasting on sleds and wagons	4	180
Roller skating	2	24
Bicycle riding	1	42
Playing games	5	162
Other causes	39	1,020
Collision of vehicles	8	1,074

In the above table under the head "other causes" are included such items as falling or boarding vehicle in motion, pushed off sidewalk by crowd, struck while clean-

ing streets, etc. Undoubtedly there will be seasonal variations apparent when reports for other quarters are made. Such items as coasting may be expected to decrease while accidents due to playing games, bicycle riding and roller skating will undoubtedly increase in the second and third quarters.

Analysis having revealed that injury and loss of life is very heavy among school children, the department immediately began to cooperate with the public school authorities. Talks have been given and every effort made to inculcate in the minds of the school children the "safety first" idea.

Marcus Dow, secretary of the Bureau, has given lectures to patrolmen instructing them how to cooperate with the Bureau. Police lieutenants have been detailed to hold safety meetings in garages where they have talked to thousands of chauffeurs. Whenever the opportunity is presented "jay walkers" are cautioned against continuing an unsafe practice.

The department's brake squad tested 5,378 motor vehicles and found 623 with minor defects. Two hundred vehicles were found to be so unsafe that summonses were handed to owners for neglecting to take necessary precautions.

Faulty Brakes as Cause of Accidents

In connection with the surprisingly little work carried on to determine the exact cause of accidents there is one particular factor neglected, and that is brakes. Many positive statements are made daily with regard to the percentage of accidents caused by faulty brakes. Estimates run all the way from 30 to 80 per cent, but no two persons agree for there are no accurate figures on which to base an estimate.

Information secured through analysis of traffic statistics for any specific city, while not indicative of country-wide conditions, may nevertheless help in conducting surveys in other cities. Hence, further particulars regarding New York City's traffic situation may have many characteristics of other large urban centers.

One of the first steps in studying the causes of motor vehicle accidents is to classify them according to the type of vehicle responsible. Fig. 1 shows the average percentage distribution of vehicular deaths and injuries for 1920 to 1922 inclusive, classified according to passenger cars, trucks, taxicabs and other vehicles. Under the heading "other vehicles" are included railroad trains, buses, motorcycles, street cars and passenger and commercial horse drawn vehicles. This chart is confined to fatalities and injuries to pedestrians and does not include accidents caused by collisions. Fatalities account for about 4 per cent of the total. Yearly percentages in any classification

do not vary more than 5 per cent from the average.

This percentage distribution of accidents might not hold for all cities and certainly would not for outlying communities. Railroads would doubtless be a great factor and street cars a lesser one.

About 90 per cent of vehicular deaths and injuries in New York City in 1922 were caused by motor vehicles, whereas the average for the entire country was about 24 per cent lower.

The following table shows the percentage of total fatalities for three years distributed according to the ages of the victims:

Year	AGES			
	Under 6	6 to 15	15 to 49	Over 50
1920	18.9	35.4	20.8	24.9
1921	18.5	33.9	21.8	25.8
1922	18.6	38.1	19.7	23.6

Accident growth rate is not as rapid as the increase in number of motor vehicles in operation. This fact holds true for the entire country as well as New York City. The following table gives the number of deaths or injuries per 100 vehicles in operation in New York City exclusive of collisions:

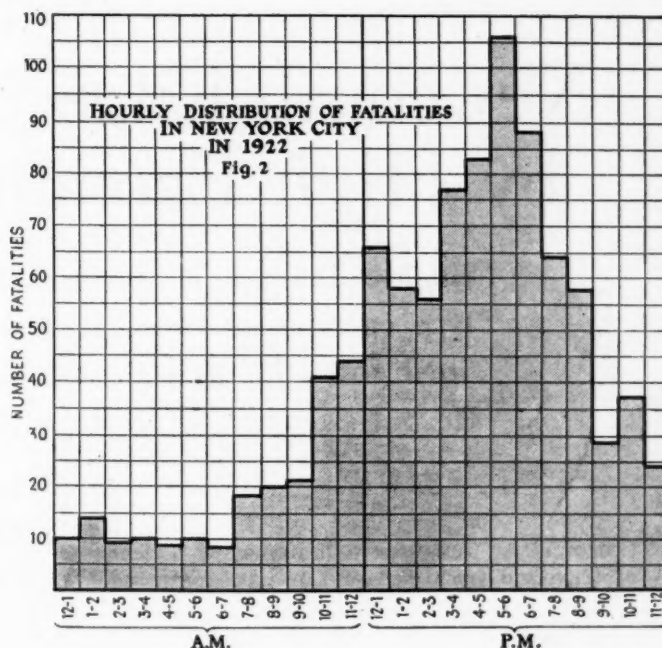
	Deaths or Injuries Per 100 Vehicles	
	1921	1922
Passenger cars	5.1	4.5
Trucks	6.4	6.2
Taxicabs	14.0	15.0
Buses	35.0	20.0

Motor vehicle registrations in New York City have grown nearly 2½ times as fast as the number of accidents to pedestrians in the past year.

Deaths and injuries caused by collision between motor vehicles and other vehicles numbered 33.3 per 1,000 vehicles in 1921 and 34.4 per 1,000 in 1922. In other words, registrations increased nearly 4½ times as fast as the increase in collision accidents per 1,000 vehicles.

New York police have made another interesting study to determine the hours in the day during which most accidents occur. This study is graphically shown in Fig. 2. This chart portrays all the fatalities which occurred in the city during the year 1922.

This chart shows that there are three distinct "peaks" in the number of fatalities during a period of 24 hours. The greatest number occur between the hours of five and



six, when the business houses close for the day. At this time the streets are most congested with pedestrians and motor vehicles of all types.

Two lesser peaks occur between 12 and 1 at noon and 10 and 11 at night. A study of this kind shows a situation which might have been assumed to be true but which would not have been known definitely. It enables the police force to be arranged so that the maximum number of men may be on duty at the crucial time. It shows people that it is best to be off the streets during rush hours.

Prevention of accidents may be tackled in three different ways to lower even further the rate of deaths and injuries. They are:

1. To educate the pedestrian and school child to keep out of danger. This New York survey shows the pedestrian to be largely at fault.
2. Educate the drivers of motor vehicles to observe traffic regulations and safety precautions with even greater care.
3. Perfect traffic regulations themselves.

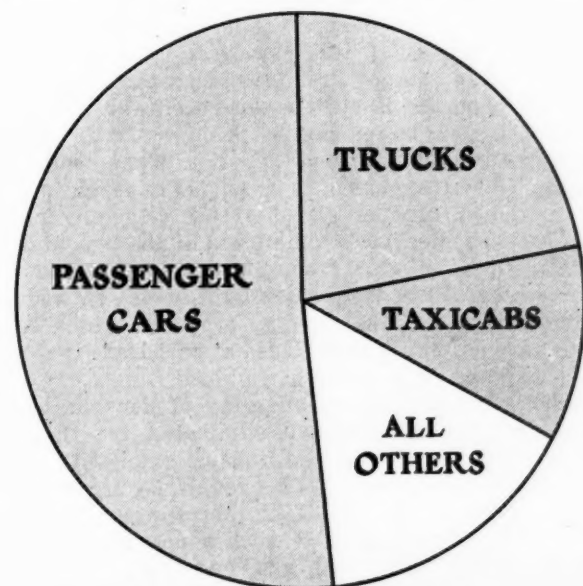
Room for Improvement in Traffic Laws

Much remains to be done in all cities to improve traffic regulations. It entails a large amount of analysis and study if the rules are to be just to all parties concerned. Legislative bodies are not qualified to take decisive action until they have made a thorough study of the problem.

A special committee under the auspices of the American Engineering Standards Committee is developing a national safety code for brakes and brake testing. Need for such a code is emphasized by the increasing tendency toward State and municipal legislation. Until authoritative data are obtained legislative measures will be more or less shots in the dark, and the industry can ill afford it.

The American Railway Association has recently undertaken a "careful crossing campaign" which automotive associations are indorsing. This action on the part of the railways should do much to reduce the loss of life in rural localities where grade crossings are a menace.

An exhaustive study to determine the cause of accidents has just been undertaken by the National Bureau of Casualty and Surety Underwriters. This work will be carried on for a number of years, and will cover all sections of the country. When it is completed it will be found without doubt that many of our ideas as to the causes of accidents are erroneous.



Newcomb Engine Is Characterized by High Economy at Part Load

Single-cylinder unit of constant compression, localized charge type operates on two-stroke cycle. Chassis weighing 1300 lb. fitted with this power-plant said to travel 65 to 80 m.p.g. Head designed to prevent commingling of charge and spent gas.

By Herbert Chase

TO design any four-wheeled automotive vehicle capable of traveling from 65 to 80 or more miles per gallon of gasoline consumed is a rare accomplishment. This result is said to have been obtained by Edward C. Newcomb whose constant compression localized charge engine and light experimental truck chassis are here fully described for the first time. The vehicle in question, designed originally as a half-ton truck, but closely resembling a passenger car chassis, weighs about 1300 lb. empty and is credited with making as high as 83 miles per U. S. gallon when traveling on hard and flat roads at an average speed of 18 m.p.h. Other tests at the same speed over rolling country are said to have shown mileages of 68 to 72 m.p.g. repeatedly.

Of particular interest is the design of the engine, which has a single cylinder of $4\frac{1}{2}$ in. bore and a stroke of $5\frac{1}{2}$ in. This engine develops slightly over $13\frac{1}{2}$ hp. at 1100 r.p.m. and, what is more important, has an economy load curve which is almost flat from one-third load up to full load. In fact, the economy at one-third load is higher than at full load.

The engine here described operates on a two-stroke cycle but the same general principles can, if desired, be applied to a four-stroke cycle engine.

Within the ordinary range of driving speeds, the engine is quite as flexible as most conventional four-stroke engines and is free from the erratic operation which ordinarily characterizes the two-stroke type, especially at light loads. In fact, the engine, even in a single cylinder unit, idles perfectly and operates just as steadily as any four-stroke engine under all load conditions and at speeds of 300 r.p.m. or less.

The common faults of the ordinary two-stroke type, namely, lack of flexibility, erratic operation, especially at part loads, tendency to backfire into the crankcase, and tendency to leaky crankcases, are successfully and simply overcome, while the economy, which in many two-stroke engines is exceedingly poor, is in this engine better than that of the four-stroke type at most loads, although at full load it is not quite as high as can be secured with the four-stroke type.

Uses Crankcase Compression

From the accompanying sectional view of the Newcomb engine, it will be observed that the charge is drawn through a carbureter and an automatic poppet valve (a rotary or other positive valve can be used here to advantage) into the closed crankcase. In this design, the crankcase is split vertically on the center line of the cylinder and is made to conform quite closely to the space swept out by the crank. On the down stroke of the piston the new charge is compressed in the crankcase and passes first

parallel to the crankshaft and then upward through a tube parallel to the axis of the cylinder and through a poppet transfer valve into the cylinder head.

The transfer valve is positively actuated from a cam mounted on the camshaft and, therefore, operates in definitely timed relation in respect to the other functions of the engine. The charge passes the spark plug placed horizontally just above the transfer valve and enters a comparatively long, narrow L in the head of the cylinder. In so doing, it pushes before it spent gases remaining in the cylinder and the latter pass out through the exhaust ports, of which there are four spaced evenly around the cylinder at a point just above the piston, when the latter is at the bottom of its stroke.

Loss of Charge and Commingling Minimized

As is well known to those who have made a study of two-stroke engines, the inertia of the exhaust gases leaving the cylinder at high velocity, at the bottom of the stroke, sets up a surge in the exhaust manifold and piping. This, in most two-stroke engines, has a tendency to short-circuit the incoming charge and causes a part of it to follow the spent gases out through the exhaust port, at the same time violently agitating and commingling the remainder of the charge with spent gases remaining in the cylinder.

Simple and effective means of preventing this fault and the consequent erratic operation which follows, if it is permitted, are used in the present instance and upon these features the success of this engine in large part rests.

It will be noted, in the first place, that the shape of the combustion chamber is such as to encourage an orderly passage of the incoming charge through the L chamber and into the gradually expanding neck of the combustion chamber. This arrangement is presumed to result in pushing the exhaust product ahead of the incoming charge without any considerable commingling of the two, and also gives, as will be evident from the drawing, a minimum area of contact (about 2 sq. in. at light loads) between the incoming charge and the residual products, which latter, of course, are not entirely displaced at part load. Probably some spent gases remain also at full load.

It is not claimed that commingling of new charge and spent products of combustion is eliminated, but that it is minimized is evident from the unusual regularity in the performance of the engine. This regularity is, of course, favorably influenced by the fact that the spark plug is located at the end of the L in such a position that it is always in contact with fresh gas. At low loads, in particular, it is evident that conditions for reasonably complete segregation of the charge are excellent.

Another most important means for minimizing commingling is a butterfly throttle valve placed in the exhaust

pipe and inter-connected with the throttle in such a way that it is opened gradually as the throttle is opened. On this account, the exhaust is more and more throttled as the load on the engine decreases. As a result, the pressure in the cylinder does not fall so rapidly when the exhaust ports are opened and the pressure difference existing between the gases within the cylinder and those in the transfer passage when the transfer valve opens is small. As a result, there is little, if any, tendency for the incoming charge to penetrate the residual gases in the cylinder and pass out through the exhaust ports unburned. Under full load conditions, the natural resistance to flow in the exhaust passages and exhaust pipes is sufficient to perform the same function as the throttle, the latter being wide open.

Crankcase Sealed by Rings

It should be understood that the exhaust is never throttled enough to prevent sufficient scavenging of the engine. In the present design there is a by-pass around the exhaust throttle. The gases which flow through this by-pass are carried through a cored passage under the bottom part of the crankcase, which is thereby heated to assist in vaporization of the fuel.

The charge in the crankcase is, of course, violently agitated by the motion of the crank, but care is taken to prevent mechanical throwing of liquid fuel into the transfer passage by placing the entrance to this passage in the plane of and above the crankshaft main bearing rather than in a plane at right angles to the crank throw.

The crankcase is sealed at each end of the crankshaft by two ordinary piston rings which fit loosely into grooves turned respectively in the

tofore given trouble when crankcase compression is employed.

Both of the crankshaft main bearings are of the straight roller type, and a similar bearing is used on the big end of the connecting-rod. These bearings require only a very small quantity of oil. The only rubbing surfaces which require much lubrication are the cylinder bore and the piston pin, and these are fed by splash in the usual way. Oil is fed to the crankcase through a mechanical oiler and there is never more than two ounces of oil in the crankcase. There is said to be no reversal of stress on the crankshaft bearings with this type of engine, and it is claimed that no trouble whatever from dilution of crankcase oil has been experienced.

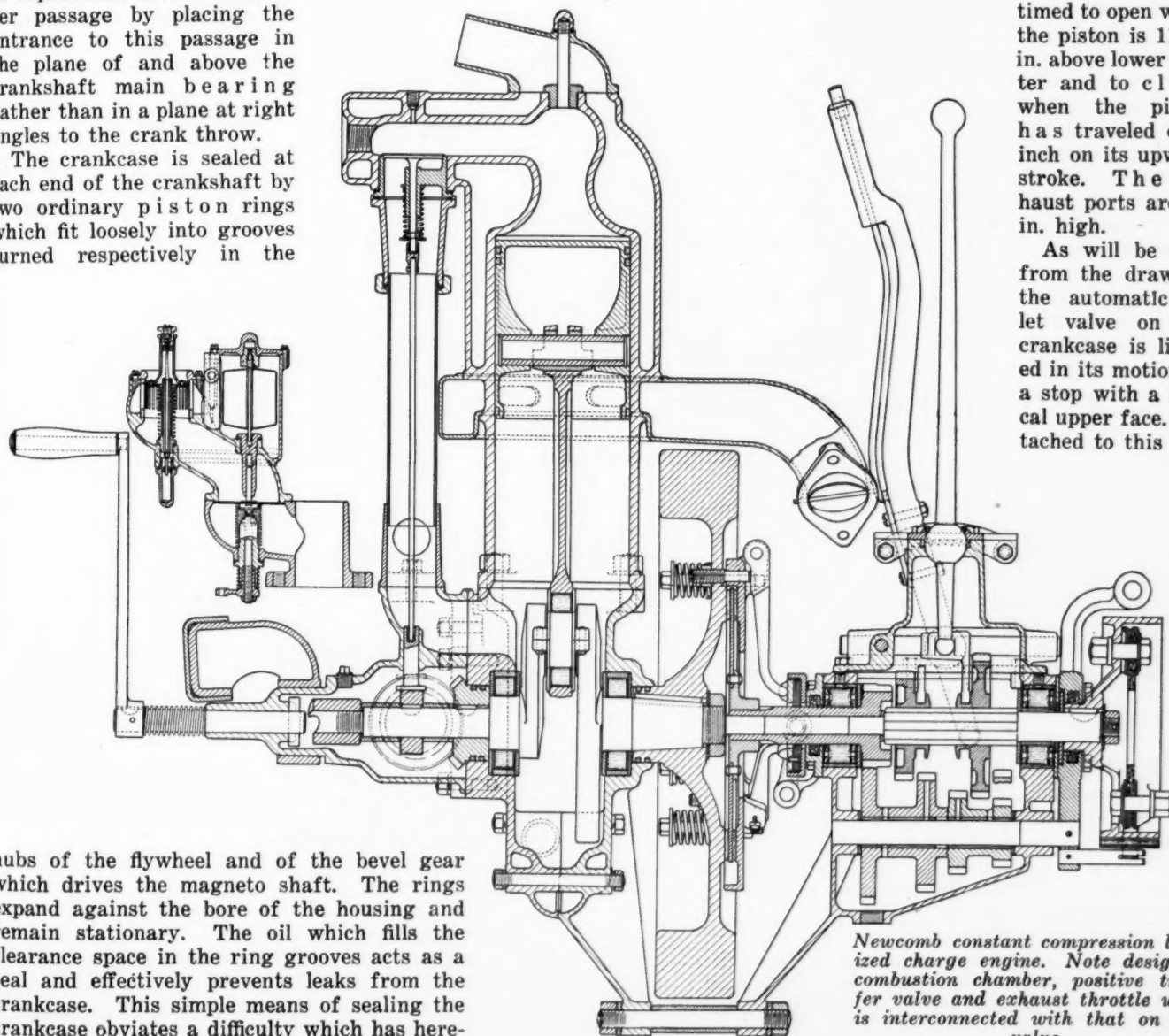
The lubricant is, doubtless, diluted more or less by fuel contained in the incoming charge, but the heat on the crankcase can be made sufficient to distill the fuel from the oil, and fresh oil is, in any case, being continuously furnished.

No Separate Camshaft Required

It will be noted that the cam which actuates the transfer valve is mounted directly on the crankshaft so that no separate camshaft is required. The transfer valve is an ordinary light poppet type, held to its seat by a spring and lifted by a push rod in contact with a mushroom type of

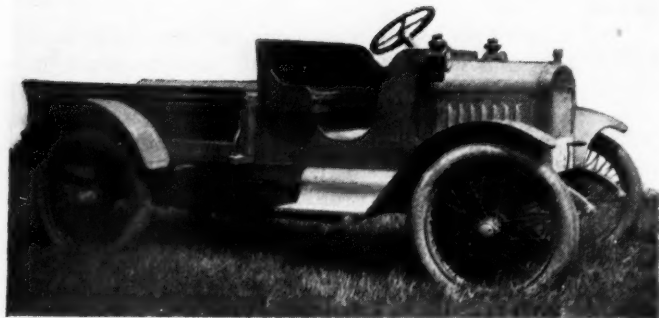
cam follower. The transfer valve is timed to open when the piston is $11/32$ in. above lower center and to close when the piston has traveled one inch on its upward stroke. The exhaust ports are $5/8$ in. high.

As will be seen from the drawing, the automatic inlet valve on the crankcase is limited in its motion by a stop with a helical upper face. Attached to this stop



Newcomb constant compression localized charge engine. Note design of combustion chamber, positive transfer valve and exhaust throttle which is interconnected with that on inlet valve

hubs of the flywheel and of the bevel gear which drives the magneto shaft. The rings expand against the bore of the housing and remain stationary. The oil which fills the clearance space in the ring grooves acts as a seal and effectively prevents leaks from the crankcase. This simple means of sealing the crankcase obviates a difficulty which has here-



Experimental half-ton Newcomb chassis which is said to travel 65 to 80 or more m.p.g. at 18 m.p.h.

is a lever, the turning of which varies the position of the stop and the consequent maximum opening of the valve. This acts as a throttle lever which is interconnected with the exhaust throttle, as mentioned above. No butterfly throttle on the carbureter is required. The spring which holds the automatic inlet valve on its seat is now set for a 12-ounce pressure, but a much heavier spring was employed when the torque measurements plotted on the accompanying curve were secured. This accounts, in large part, for the rather rapid falling off in the curve at high speed and indicates that a positive valve is desirable. The design is such as to give a maximum crankcase pressure of approximately 5 lb. per sq. in.

The exhaust is collected in a split ring casting which incloses an annular space around the cylinder casting. One outlet from this annular contains the exhaust throttle and opens directly into the exhaust pipe, and the other connects to the by-pass running to the lower part of the crankcase, as mentioned heretofore. The exhaust ports are $\frac{5}{8}$ in. high and have a total length equal to about one-half the circumference of the cylinder bore. They are four in number and are equally spaced around the cylinder bore.

Cooling is effected by thermo-syphon action. It will be noted that the combustion chamber walls are entirely surrounded by water, with ample space provided for easy circulation.

Backfiring Into Crankcase Precluded

Backfiring into the crankcase is said never to have occurred, and it is believed to be precluded, for the reason that the design is such as to localize all or a portion of the fresh charge in the L part of the combustion chamber. This portion of the charge remains substantially free from residual products of combustion and is, therefore, quickly burned after ignition, so that only spent gas remains in the L when the transfer valve opens.

The engine idles as well as any single cylinder four-stroke engine the writer has ever seen, and the note of the exhaust is exceptionally regular. In order to demonstrate the effectiveness of the exhaust throttle in facilitating smooth running under idling and load throttle conditions, this element was temporarily disconnected and left open. The engine continued to run, but the action became somewhat erratic, though much less so than that of the ordinary two-stroke engine under similar conditions.

To demonstrate further the effectiveness of the exhaust throttle, not only in respect to regular running but in respect to its effect on fuel economy, separate tests have been made, first, with the exhaust throttle wide open and, second, with exhaust throttle inter-connected with the inlet throttle. With all other conditions remaining the same, the mileages reported were respectively 47.2 and 66 m.p.g. This, of course, shows conclusively that the exhaust throttle is exceedingly effective in saving fuel.

The functioning of the Newcomb engine is in marked contrast with that of the ordinary two-stroke engine in which, especially under light loads, the commingling of new and spent gases not only makes ignition uncertain but retards the flame propagation to such an extent that the charge is still burning when the transfer valve opens, and there are consequent backfires into the crankcase. Some sort of screen is usually employed in the transfer passage to prevent ignition of the charge in the crankcase. The rich mixture and retarded spark, which is sometimes used in an effort to remedy this condition in the ordinary two-stroke engine, of course, increases the tendency toward inefficiency, while the use of a screen in the transfer passage retards the flow of incoming gases and reduces the volumetric efficiency and power output. These expedients are not employed in the Newcomb type.

Localized Charges Successfully Employed

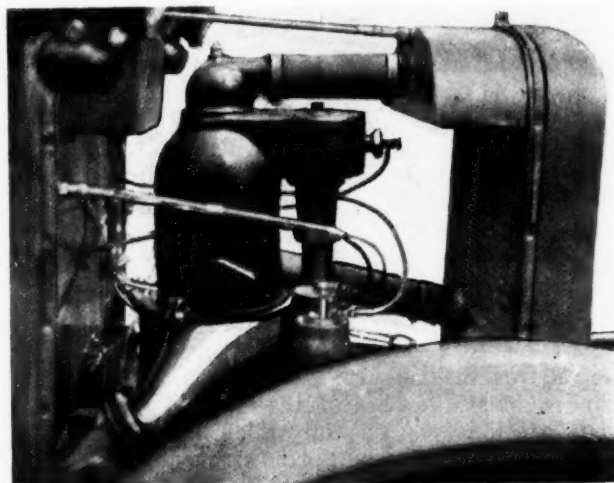
The performance of this engine appears to definitely establish the fact that localized charges can be employed successfully, and that high turbulence is not necessary for economical operation. Of course, any considerable degree of turbulence in this type of engine would entirely defeat the object of the design.

A compression pressure of approximately 67 lb. per sq. in., corresponding to about a 3.8 to 1 compression ratio, is employed. The engine is notably quiet in its mechanical operation, but, in common with other single-cylinder engines, it is not so easy to muffle the exhaust as with multi-cylinder types. Of course, care must be used also not to create excessive back pressure in any two-stroke engine. In this case, the muffler is simply a long cylinder into which a few screens have been introduced to prevent the backslap of the exhaust charge which would otherwise tend to make considerable noise. With this muffler, the operation is sufficiently quiet at least for truck service.

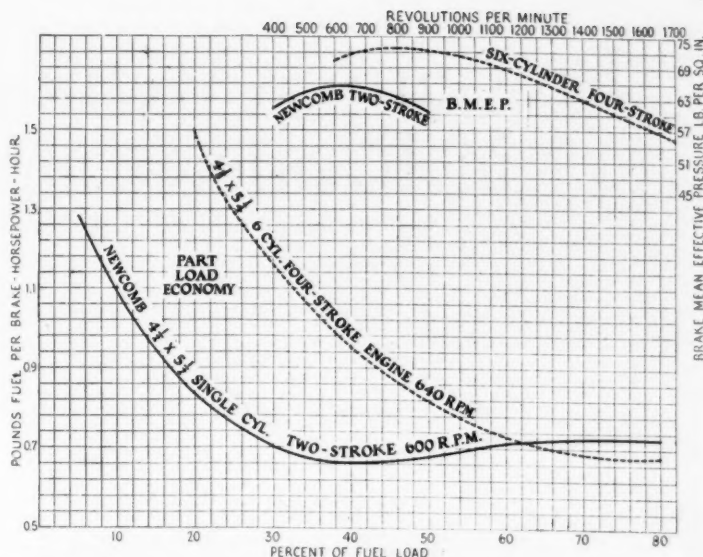
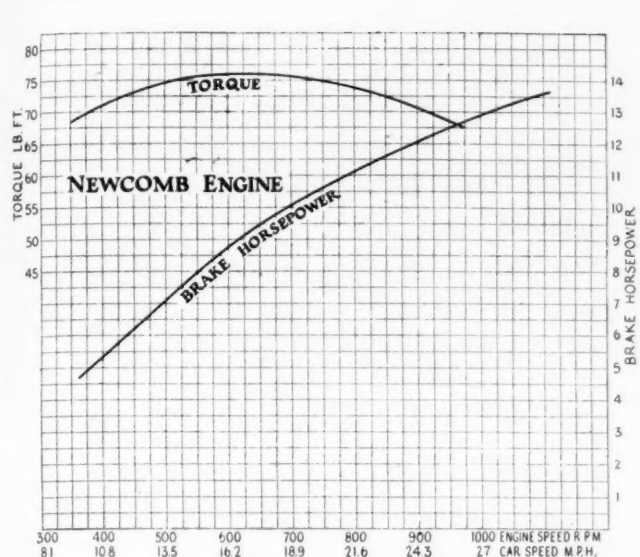
The engine is, of course, inherently a (substantially) constant compression type, and this factor, together with the localization of the charge and the high mechanical efficiency, tends to make it much more economical on part loads than are four-stroke engines.

The carbureter employed is a simple type designed especially for the engine by E. C. Newcomb. Ignition is by Bosch magneto, driven off the crankshaft by bevel gears at crankshaft speed.

The writer, in driving the car, found that the engine accelerates well, considering its power and the weight of the vehicle. Its performance compares favorably with that of other cars of similar size fitted with larger engines,



External view of upper part of Newcomb localized charge engine



Left—Power and torque-speed curves of single cylinder $4\frac{1}{2} \times 5\frac{1}{2}$ in. Newcomb engine. Right—Comparative economy-load and b.m.e.p.-speed curves of Newcomb engine and a conventional six-cylinder, four-stroke engine

owing to the high torque developed at low speeds. Pulling on hills is especially good.

By way of comparison, the accompanying curves plotted between per cent loads and pounds of fuel per b.h.p. hr. are interesting and instructive. Data on the four-stroke engine are taken from a test of a six-cylinder four-cycle $4\frac{1}{8} \times 5\frac{1}{2}$ in. engine, made by W. T. Fishleigh and W. E. Lay of the University of Michigan.*

It will be noted that the economy of the two-stroke engine is much better than that of the four-stroke at loads below 60 per cent of full load. At higher loads it is very nearly the same as that of the four-stroke engine. This, of course, is a clear indication as to the reason for the exceedingly good fuel consumption record set up by the car equipped with the Newcomb engine. Since the average load in average passenger car operation is only a fraction of the full load of the engine, it is highly desirable to have an engine which is economical under these light load conditions.

From the comparison of mean effective pressure curves, it will be noted that the m.e.p. of the two-stroke engine is only about 10 per cent lower than that of the four-stroke. On this basis an engine with the same bore and stroke and the same number of cylinders would, in the case of the two-stroke type, be capable of developing, within its speed range, a torque almost double that of the four-stroke engine. On the other hand, it would probably have a lower maximum speed but could be geared accordingly. Of course, the torque of the two-stroke engine on which the data are given is not as high as can be obtained with four-stroke design, but it is probably fairly representative of the average automobile engine in use today.

Newcomb Chassis Conventional

Aside from the engine, the construction of the Newcomb chassis does not depart radically from conventional practice, but it, nevertheless, contains some elements of interest. The engine drives through a simple design of single plate clutch fitted with three springs and disengaging levers with adjustable fulcrum studs fitting into the flywheel. A plain thrust collar is used at the throwout. No ball bearings are employed. The clutch pilots on an extension of the crankshaft.

The three-speed gearset is bolted to the crankcase of the engine at three points by a spider type casting, forming

an open bell housing. The gearset is a simple three-speed type, with the main shaft fitted with straight roller bearings. Attached to the rear of the gearset is a contracting type foot brake. Inside the brake drum is a fabric universal joint. The hand brake operates on drums attached to the rear wheels. The rear axle is a simple semi-floating type with bevel type differential and is geared 3-1/3 to 1. The drive is of the Hotchkiss type and all springs are conventional semi-elliptics. The wire wheels are equipped with $30 \times 3\frac{1}{2}$ in. cord tires.

A bevel pinion and sector type steering gear is employed. The front axle is a conventional Elliott type with I-shaped center section.

Frame members are straight and converge toward the front. The chassis has a 96 in. wheelbase. It is said to be capable of making maximum speeds of about 35 to 40 m.p.h.

From the foregoing, it will be seen that the engine, as well as the other parts of the chassis, lend themselves readily to light and inexpensive construction.

Definite plans for manufacture of the engine have not yet been made, but shop rights on the engine are now being offered.

Little Variation in Sales Periods

THERE is no great variation in seasons in Italy from the point of total sales of automobiles, according to a report to the Department of Commerce, but there is a marked difference in style of cars sold.

Relatively large sales of open cars are made in March to June, with sales slackening in July and August, and closed car business is active in September to October, letting up a little from November to February. This is particularly true of the North of Italy. It is difficult to discover any seasonal difference at all in the South, where the weather is about the same all the year round.

It is the custom of many automobile users in Italy to order the chassis, and after the chassis has been delivered to have a body made to order. This practice tends to obscure the seasonal movements. Furthermore, in analyzing past figures, the seasonal trend is hard to follow for the reason that from late in 1918 to well into 1921 import permits were required, and Italian importers had to bring in cars whenever they could secure the permits.

The foregoing remarks apply primarily to imported cars.

*See Transactions of the Society of Automotive Engineers, Part 1, Vol. 12.

Preventive Methods Eliminate Rust in Fender Enameling Process

Rejections cut 60 per cent by precautions taken. Heated parts are treated with Deoxidine. Cold water and hot water baths follow in succession. Care in handling reduces chance of marring metal surface. Operations produce durable finish.

By J. Edward Schipper

BY eliminating rust troubles, rejections on fender enameling jobs for Hupmobile cars have been cut 60 per cent. Rust formerly was responsible for two-thirds of all rejections. Preventive methods have been used in removing the difficulty. Causes of rust are eliminated before the fenders are sent through the enameling process, while elaborate precautions are taken to prevent rust-causing deposits on the metal.

When the fenders leave the metal department, they are far from clean. They are covered with finger marks, oil and rust scarcely visible to the naked eye. These deposits must be removed, of course, if a proper finish is to be applied. Enamelled fenders drawn from factory stock-rooms, for instance, frequently show spots indicating rust beneath the enamel surface as well as actual marks on the surface itself. Such spots cause the enamel to chip off shortly after the car has been put into service.

To prevent such difficulties, the precautions mentioned have been taken in enameling Hupmobile bodies at the Detroit Auto Specialty Co., a division of the Hupp Motor Car Corp.

The first step is to heat the fenders in a gas oven until they reach a temperature of 420 deg. Fahr. About 50 or 60 fenders are handled in this gas oven at a time. If smaller parts are being heated, sometimes as many as 400 pieces are placed in the oven simultaneously. The length of time the pieces remain in the oven varies in accordance with the number, or the oven load, as this affects the time required to reach the temperature of 420 deg.

The purposes of heating are to drive off the volatiles from any deposit which may be on the surface of the metal, to get an immediate action by the Deoxidine, application of which follows, and to help take off the mill stamp from the sheet metal.

Deoxidine is applied to the heated parts either with steel wool or with cloth, according to the desire of the operator and the nature of the fender surface. It requires about 2 min. per fender to apply the Deoxidine. It is most commonly applied with steel wool, which, in addition to applying the chemical, has a scouring action which helps in the removal of any small surface deposits.

Operators, in applying Deoxidine, wear rubber boots, aprons and gloves. Many wear cotton gloves over the rubber gloves to preserve the latter, particularly when using the steel wool. Any actual rough spots are rubbed with emery cloth.

Deoxidine Remains Until Enameling

As the parts are covered with Deoxidine they take on a silver finish which remains until the enamel is applied. Any rubbing necessary by reason of rust or other deposits is performed immediately after the Deoxidine has been applied. Then the fenders are dipped in a clear, cold water bath. The water in the tank is renewed constantly by a fresh supply so as to be kept clean, the overflow draining off. Deoxidine, which has a phosphoric acid base, is soluble in water, so that the bath cleanses,



1—Preparing the surface of the fenders for the enameling by rubbing with Deoxidine. The Deoxidine rub is given with steel wool, the operators wearing rubber gloves and generally cotton gloves over these. The rubbing deck is shown in the foreground. It has a drain which permits the Deoxidine to be conserved. The cold and hot water tanks into which the fenders are dipped after the Deoxidine process are shown behind the rubbing deck. 2—Air blow-off and wipe given fenders after they leave hot water tank and before being dipped in enamel. The final wipe-off operations are first with a rag dipped in naphtha and finally with a tack rag

takes the Deoxidine from the surface, but leaves it in a rust resisting condition. The commercial value of this process is made possible by the fact that the salts of phosphoric acid are inert.

After the cold water bath, the fenders are immersed in hot water so that the metal will dry quickly. Leaving the hot water tank, they are taken to a bench where the moisture is blown off with dry air. Operators are compelled to wear cotton gloves to prevent finger markings after this process.

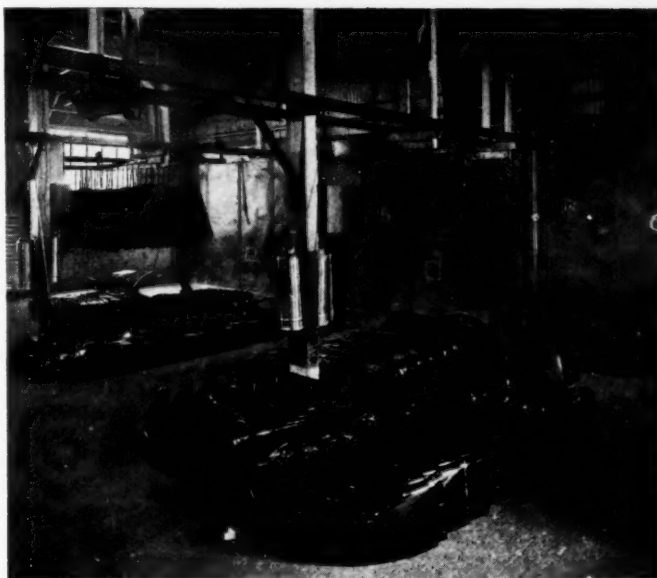
The air hose used in drying has an iron nozzle. A brass nozzle cannot be used, because experience has shown that wherever brass comes in contact with the steel, a mark will show up through the enamel. In other words, it is possible to take a brass pencil and write invisibly on steel, but after enamel has been applied the writing would become apparent. To avoid any risk of brass touching the steel, the iron nozzle is employed.

Wiping Follows Air Blast

After the air blast, the fenders are wiped off with a rag and then inspected for scratches or any other marks which would be apparent through the enamel. After passing inspection, the fenders are wiped off with a rag dampened with naphtha to pick up any white deposits or other material which may have collected in handling. The operators, of course, wear cotton gloves all through this process.

Following the rub with the naphtha cloth, a tack rag process is given. This, of course, is an operation common to all enameling work.

The actual enameling operations are the same here as in any other similar plant. The fenders are dipped in enamel tanks and passed over drip troughs to reclaim the excess enamel, after which they are passed into the ovens, where they are kept at a temperature of approximately 450 deg. for two hours. The enamel is kept clean by providing double entrance doors to the enameling room and the enamel that drains back to the enameling tank must pass through a 200 mesh sieve where any scale or chip is screened out. This 200 mesh, with 40,000 holes to the square inch, is sufficiently fine to take out any but the smallest dust particles.



3—Finished fenders after they have left the enamel drying oven

As a precaution against any dust which may have entered the first enameling room, there is a rubbing process after the first enamel, following which the fenders are again dipped and passed through the second oven in exactly the same manner as through the first. The rub between the two enameling processes is the usual pumice rub. The enamel employed is Donahue, which is held at a Baume of 31.5, and works at a temperature of between 92 and 95 deg. Fahr.

By adopting the Deoxidine process, no change has been made in the actual enameling operations, but the preparation of the work as regards elimination of rust replaces the alkali bath formerly used for cleaning. The 60 per cent reduction in rejections is entirely traceable to the elimination of rust troubles, and the net result has been a considerable saving in the expense of the department. It is, of course, far less expensive to purchase and apply the Deoxidine in this case than to strip the rejected fenders and run them through the process of enameling again.

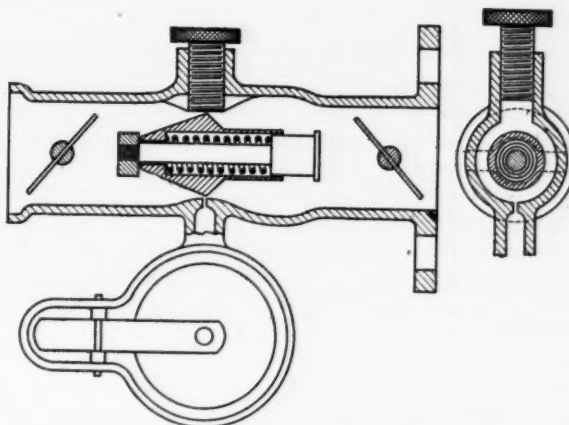
Low Fuel Consumption Claimed for New Jorden Carbureter

THE Jorden carbureter is a newcomer in the field. In the horizontal type a small orifice is drilled from the float chamber into the throat of the air passage, forming the fuel nozzle. A brass conical frustum slides on a concentric spindle in the throat to regulate the air opening at various throttle conditions. Movement of the cone tending to open the air orifice is controlled by a coil spring which is telescoped into the cone. The drilled hole into which the spring is inserted is very nearly closed by the barrel which forms the stationary spring support. A dashpot is thus formed whose action tends to prevent fluttering of the metering cone.

A section of the throat is cut away opposite the fuel orifice to provide the greater portion of the initial or idling air passage. An adjusting screw, the diameter of which is slightly greater than the width of the section cut out provides the necessary regulation. Performance at high speed is regulated by adjusting the tension of the coil spring.

Claims made for this device, now being produced by

the Central Plating & Mfg. Co., are easy starting, low fuel consumption and rapid acceleration.



Sectional views of Jorden carbureter

Giving Away One Idea Brings Back Three or Four

Electric Steel Founders' Research Group shows possibilities of cooperative industrial effort. Studies made of quality and production methods improve business. Mutual confidence established among competitors. Marketing ideas are discussed.

By Norman G. Shidle

YOUNG in years and progressive in ideas, the automotive industry has always fostered the exchange of information within its own boundaries. Standardization was developed through the vision of engineers and manufacturers who saw the need for mutual effort along this line. Individual business was increased through constructive development of the industry as a whole. That development was made possible on a large scale through standardization—and standardization meant exchange of information and frank discussion of common problems.

Quantity production methods have been largely the result of a mutual exchange of information among manufacturing men. Lately this process has taken a more concrete form in S. A. E. production meetings.

Study of marketing methods is a more recent development. Little information is readily available at present. There is less disposition, however, to exchange data on merchandising than on production and engineering problems. Even in the engineering and production field further steps along this line may well be taken.

Possibilities of cooperative industrial effort are well illustrated by the work done in the last three years by a group of five steel casting concerns. These companies furnish considerable material to the automotive industry, so that their efforts have a specific, as well as a general, interest to vehicle and parts manufacturers. The Electric Steel Founders' Research Group was founded about three years ago, for the purpose of improving the quality of the product and of decreasing manufacturing costs. The companies belonging to the group are: Electric Steel Company, Chicago, Ill., Fort Pitt Steel Casting Co., McKeesport, Pa., Lebanon Steel Foundry, Lebanon, Pa., Michigan Steel Casting Co., Detroit, Mich., and Sivyer Steel Casting Co., Milwaukee, Wisconsin.

Forming the Organization

The first step in the organization was to procure a competent research director and to form a working organization. R. A. Bull was appointed as Research Director, assisted by William J. Corbett as Industrial Engineer. A technical committee was formed which, in consultation with the research director, determined the character and scope of the researches to be carried out. Fullest confidence among the members of the group has been necessary to make the work successful.

Researches to date have included grinding methods, welding processes, annealing, core practice, gas cutting, furnace practice, facing sand, etc. Production methods as well as physical qualities have been investigated in each instance. Departmental costs have been freely interchanged with the idea of bringing about more economical methods of manufacture.

The question of selling prices was banned at the start. Study of departmental costs has concerned only specific phases of production from a purely manufacturing standpoint without relation to overhead, administrative expense, and the other items which go to make up total manufacturing expense.

Executives and foremen of one plant are free to go into any of the other plants to see how certain processes or operations are carried on and to get ideas for application in their own plant. It was found, for example, that one company had been running its core department quite inefficiently as compared with the plant of the group that had the lowest costs for this operation. The inefficient plant had not suspected its core troubles until it compared notes with the others in the group. Similar comparison on other processes showed in each case that efficiency varied considerably from plant to plant. When this condition is found, research studies are made to determine the causes and the best methods are installed in other plants.

Cooperation Helps Equipment Buying

The cooperative effort has also been helpful in buying new equipment. When there is some question as to the best type of equipment for a certain job, two or more firms will install a different kind. Then operating efficiency and costs are compared after the equipment has been in operation for a reasonable length of time. Results of the studies are analyzed and correlated. Then it is easy to determine which type of equipment is best. The next time any of the members buy new equipment of that kind they buy the best type.

Quality and production research cooperation has been so successful that cooperative activities are being extended into the broad phases of the marketing field. A survey has been made, for example, to determine all of the possible uses of steel castings in the industrial world. To begin this list, each company submitted a list of every purpose for which it had ever made steel castings. From that list alone each company learned from every other one certain uses for its products that had been unknown to it before. Further work along this line is being carried out. Merchandising ideas are being developed and exchanged. Educational conventions of merchandising forces of the five companies are held. Chief executives address these meetings on practical topics of current merchandising interest, and operating managers discuss technical subjects.

The ultimate growth of this work cannot be predicted at present. The field is new and the possibilities great. Efforts will be carried as far as practical results indicate to be advisable.

The success of cooperative effort among these five steel casting concerns has two points of major interest to the automotive industry:

1. It gives a specific example of the benefits that can be gained from the exchange of practical information among competitors. It shows how the development of an industry or of a certain phase of an industry will benefit each individual firm in the field.

2. It shows how an important product supplied to the automotive field is being improved, both as to quality and as to methods of production. These efforts cannot fail to bring lower unit prices—or higher quality for any given price—in the long run.

The basic idea involved in this association for research is applicable to all phases of automotive work in a general way. The thought behind it is well expressed by a few lines from a speech made recently by J. L. Hanley of the

Hudson Department Store of Detroit, despite the fact that he was not speaking particularly about automotive matters. Hudson said:

"You have a dollar, I have a dollar; We swap. Now you have my dollar, And I have your dollar; We are no better off.	}	But	{	You have an idea, I have an idea; We swap. You have two ideas, I have two ideas; That's the difference."
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At all times, and all the world over, we have found the exchange of ideas a convincing factor for more complete understanding and for a widening vision.

The man who stays in his own shop, tackles his own problems and depends upon himself entirely, cannot be very successful.

Eagle Carbureter Has Dash Control for Auxiliary Air

A NEW carbureter with a dash-controlled auxiliary air passage has just been brought out by the Eagle Carbureter Company. The carbureter is of the plain tube type with a single nozzle for normal operation and a jet just above the butterfly throttle valve for idling. The auxiliary air passage is above the venturi and admits additional air to the mixture at the will of the operator.

Gasoline enters a stand pipe located in a well below the main jet through a drilled passage from the float chamber. The gasoline overflows from the stand pipe into the well surrounding it. The stand pipe projects up slightly into the main jet. Connecting with the well is a drilled passage to an acceleration well, and from this same passage is drilled a lead to the idling passage.

Air enters through a single opening, and when the auxiliary air sleeve is closed the only passage for the air is up through the venturi throat past the main fuel

dash control acts as an economizer and thins the mixture sufficiently for regular running.

When the throttle is opened suddenly, thereby increasing the vacuum above the venturi and putting an extra demand on the instrument, additional gasoline is drawn through the nozzle from the well surrounding the stand pipe and also from the accelerating well in the idling passage. Quick opening of the throttle for accelerating therefore tends to diminish the supply in these passages, and the supply is afterward replenished under normal operation at fairly constant speeds.

Under idling conditions the fuel from the well surrounding the stand pipe is lead to a point which is just above the butterfly when it is fully closed. There is an air passage which joins the idling jet to provide the idling mixture. The idling mixture is controlled by a needle valve adjustment. There is also an air hole in the screw which closes the accelerating well, this screw performing the dual purpose of closing this well and acting as one of the four screws which hold the two halves of the carbureter together. The hole is small, being restricted so as to give a slight vacuum above the supply of gasoline in the accelerating well to act as a check on the amount withdrawn from the well in case of sudden throttle opening.

There is only one main adjustment on the carbureter, this being the needle valve which controls the flow of gasoline from the float chamber into the central nozzle passage. This adjustment affects the entire range of the carbureter. In addition to this main adjustment, there is the idling adjustment mentioned and the dash control which regulates the amount of air fed to the mixture. The dash control acts as an economizer, permitting a mixture which is as lean as is desired for normal running conditions.

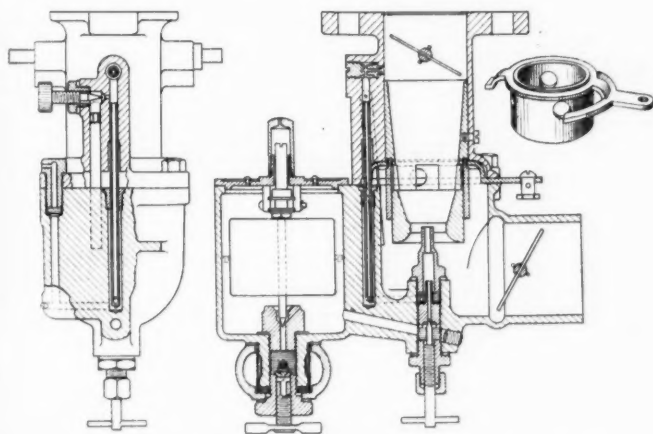


Diagram of Eagle carbureter showing detail of dash-controlled auxiliary air valve

nozzle. As the engine warms up or the speed is increased, the auxiliary air opening is moved from the dash, permitting additional air to join the mixture above the venturi. This arrangement gives the effect of having virtually a small carbureter for starting and for warming up and a full size carbureter for normal operation. The fact that the air is restricted to the venturi passage in its flow gives the desired velocity to facilitate starting. After the engine is warmed up sufficiently for normal operation the opening of the air passages by the

A NEW fire apparatus chassis has been announced by the Kearns-Dughie Motors Corp. of Danville, Pa. The chassis is designed to carry a 600 gal. pump and is known as their Model "M."

Standard equipment consists of a Wisconsin Model "M" motor with Stromberg carbureter, Bosch magneto and Leece-Neville two-unit starting and lighting equipment. A Hele-Shaw clutch and Fuller heavy truck type transmission with Sheldon worm-type rear axle are specified.

The wheel base is 160 in. and the tread 60 in. Regular equipment includes 38 x 7 cord tires, bumper, drum type head lamps, and electric tail lamp.

Government Tests Develop New Facts About Rear Axle Efficiency

Experiments conducted by Bureau of Standards for Motor Transport Division, Q. M. C. Losses divided into two groups, "load" and "no load." Former found independent of speed and lubrication while latter depends largely on viscosity of oil.

At the request of the Motor Transport Division of the Quartermaster Corps tests have been made at the Bureau of Standards of samples of axles with the various forms of drive, of a size suitable for use under the Class B Army truck. Manufacturers of truck axles were requested to furnish axles meeting the following specifications: Maximum torque input, 17,000 in.-lb.; weight on spring pads, 12,000 lb.; ground clearance with 40 in. tires, 11½ in.; reduction ratio, 8.9 min.; 10.25 max.; differential, non-locking. A number of sample axles were furnished in response to the invitation. Tests were made on these axles, as well as on a standard Class B axle with several gear carriers with different types of bearings, which latter was furnished the Bureau by the Motor Transport Corps.

An outline of the test methods employed and of the

results obtained in these tests was given in a paper by S. Von Ammon of the Bureau of Standards, presented at the recent Transportation Meeting of the S.A.E. at Cleveland. Von Ammon's paper was entitled An Investigation of Some Heavy-Duty Truck Drive Axles. Following are extracts from this paper summarizing the information contained therein.

Eight axles were submitted to the tests, their chief characteristics being given in the following table:

No.	Type	Kind of Bearings	Reduction Ratio
I	Class B	Tapered roller	9.5
II	Class B	Ball bearings and thrust washers for worm, taper rollers for differential...	9.5

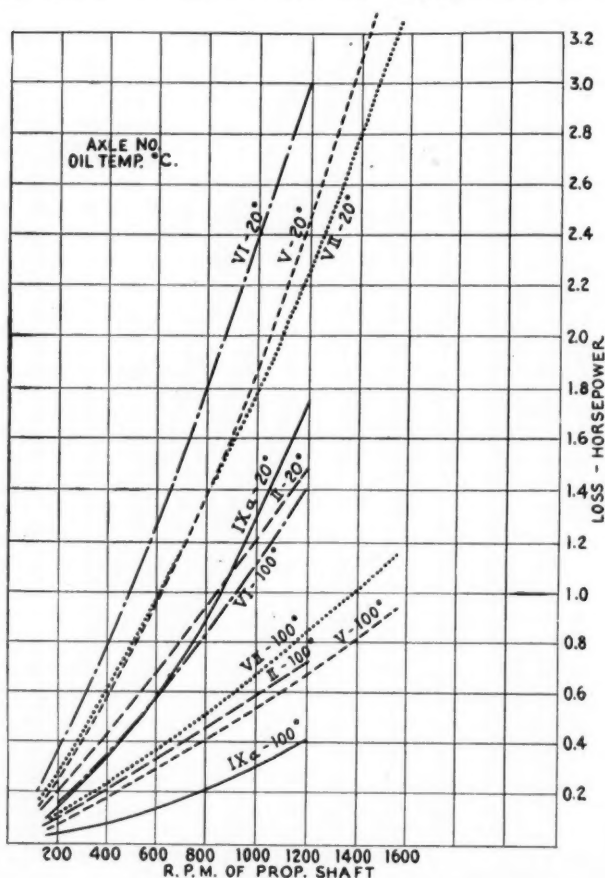


Fig. 1—Maximum and minimum no-load losses vs. speed

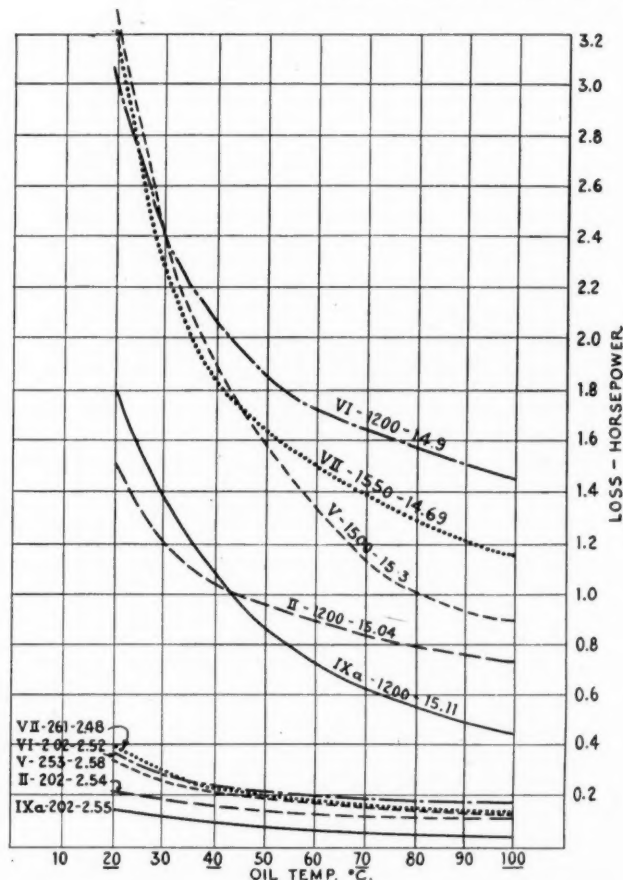


Fig. 2—Maximum and minimum no-load losses vs. oil temperature. (The curves at the bottom of the chart show the corresponding truck speeds on the basis of 40-in. tires)

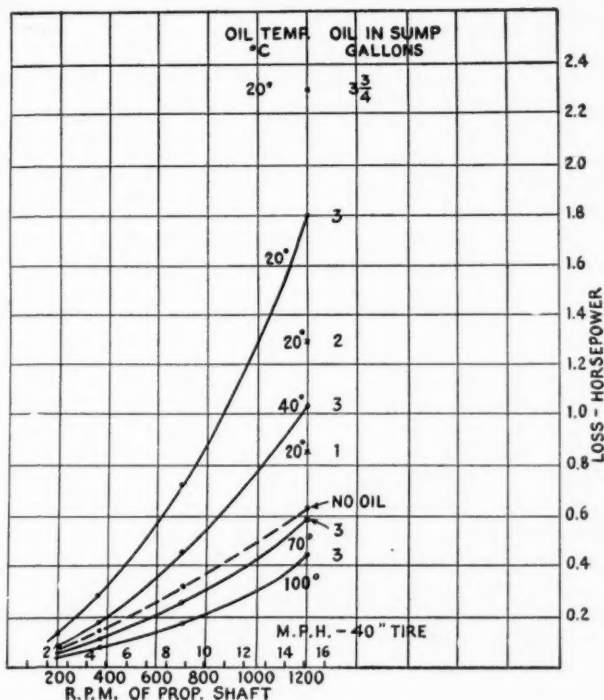


Fig. 3—Effect of amount of oil in sump on no-load losses

III	Class B	Ball bearings for worm, taper rollers for differential	9.5
V	Three-stage reduction type, two in wheels ...	Single row ball, ball thrust and flexible rollers	11%
Va	Three-stage reduction type, two in wheels ...	Single row ball, ball thrust and flexible rollers	13 1/4
VI	Internal gear	Single and double row ball	9.605
VII	Internal gear	Ball and roller	12.56
IXa	Triple reduction (all in central housing)...	Single and double row annular ball	9.43

The test results have been analyzed to show the effect of the various factors on the "no load" and "load" losses. Summaries of the results of the tests on five axles (Nos. II, V, VI, VII and IXa) are given in the charts. In studying these results it is well to consider the losses as made up of "no-load" losses and "load" losses. The "no-load" losses consist of the power expended for the necessary circulation and unnecessary churning of the lubricant, the friction in the bearings and between gear teeth, when not transmitting useful load, the windage of wheels and brake-drums, and a few smaller items that need not be considered. The "load" losses are due to the useful power transmitted to the wheels and result from the corresponding increase in tooth and bearing friction.

Loss Due to Churning Lubricant

The no-load losses (Figs. 1 and 2) increase materially with increasing viscosity and speed. If these losses are expressed as torque, it is seen that the increase is largely the result of churning the lubricant. At high temperatures the torque loss increases but slightly with increase in speed; decreasing temperature results in an increase in these losses in conformity with the rise in viscosity.

Comparing the "no-load" losses in the different axles, for any speed or temperature at which oil losses are of any moment, it is found that Axles II and IXa show lower values than Axles V, VI and VII. In Axle II the rela-

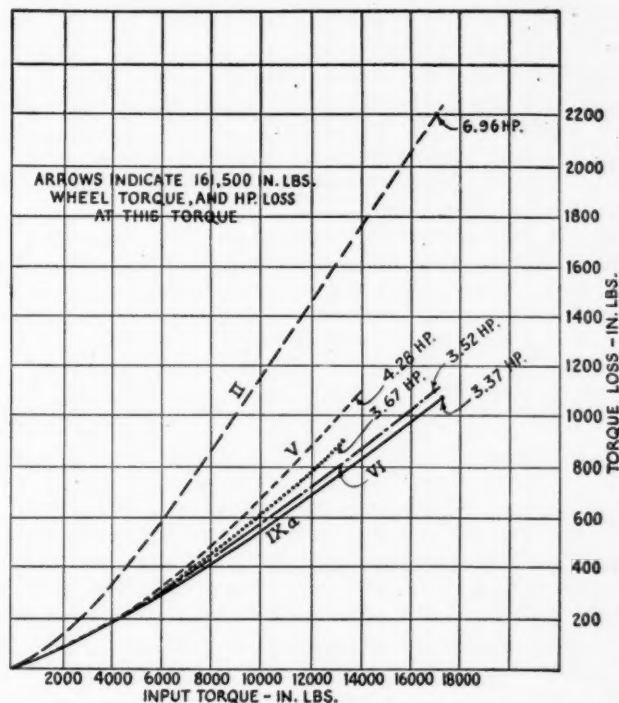


Fig. 4—Load losses in terms of torque vs. torque input

tively slowly revolving worm gear and differential and in Axle IXa the final spur gears on the axle shafts are the only parts immersed in the sump pool in the central housing. This clearly accounts for the lower oil losses compared with the other axles, in which bevel rings and differentials rotate at much higher speeds, and the circulation of the lubricant in the wheels causes additional losses.

Similarity in Gear Type Axles

The oil in the wheel would, at least at the higher speeds, tend to rotate with the wheel in a ring at the circumference of the internal-gear chamber. The end of the jack-shaft with its pinion projects into this ring of oil of a high viscosity at low temperature, and prevents the orderly progress of the lubricant. The power loss thus occasioned may be smaller with grease if a part of the lubricant adheres to the wall of the chamber away from the pinion, as it may do particularly at low temperatures. Additional obstructions in the wheel chamber, as found in Axle V, in the intermediate pinion and its supports, may add to the losses.

To obtain some data on the no-load losses, runs were made with Axle IXa with several oil levels. The regular tests of this axle had been made with 3 gal. in the sump, this unusual amount being required because of the large volume of the housing. Fig. 3 shows the "no-load" losses as observed with 3 gal. of oil at four temperatures over the range of test speeds, as well as the losses at 20 deg. C. with varying amounts of oil. The dotted curve shows that the "no-load" losses without lubricant in the central housing were constantly higher than with 3 gal. of oil at 70 deg. C.

A study of the "load" losses expressed as power shows that these increase with the input power and at a more rapid rate. There is a fair similarity in the axles of the gear type, but the worm type shows a materially greater increase in these losses with increasing input than any of the gear type axles. The viscosity of the oil, however, has no influence on the "load" losses, except in the case of Axle II, the reason for which exception is not fully understood. The "load" losses here also show an increased

rate of growth with increasing load and for a given power input with decreasing speed. If the "load" losses expressed as torque are plotted against torque input, we obtain Fig. 4 which shows clearly the similarity among the gear type axles and the separate position of the worm type, in which these losses are not only greater over the whole range of input torque, but increase more rapidly with increasing torque.

As the ratios of these axles differ, comparison on the basis of torque input and loss is hardly permissible. Fig. 4, however, shows the input torque representing for each axle a wheel torque of 161,500 in.-lb., when losses in the axle are ignored. The corresponding torque loss has been converted into horsepower loss at a wheel speed of 2.5 m.p.h. in each case, thus establishing a better basis for comparison. The total losses for the various axle types then represent the sum of these—widely and independently—varying "no-load" and "load" losses.

Summaries of the total losses and corresponding efficiencies for the five axles at 15 and 2.5 m.p.h. are plotted in Figs. 5 and 6 respectively. The influence of the viscosity of the lubricant is greatest at high speeds, and can best be seen in Fig. 5. The relation of the losses at high and low speeds for oil temperatures of 100 and 20 deg. C. is most readily seen in Figs. 7 and 8. The change in the total losses with the temperature for 5 and 55 hp. input at high and low speeds is plotted in Fig. 9.

Data from Temperature Rise Runs

Table I shows the data obtained during the temperature rise runs for all of the axles. The temperature rises at the time when equilibrium is reached range in about the same order as the losses. It will be noted that in Axle I the temperature rise at the rear bearing is closely similar to that in the sump, under these operating conditions. In Axle II, however, the rise at the bearing is somewhat less than in the sump. The difference in the temperature effects in these two cases is due to the fact

that in Axle I the rear bearing is lubricated by heated oil coming directly from the worm, whereas in Axle II most of this heated oil returns directly to the sump.

The results of the endurance run are shown in Fig. 10. A remarkably rapid rise in the oil temperature in the Class B axle will be noted. In Axles V, Va, and VII the distribution of the losses between the central housing and the two wheels would be expected to result in a smaller temperature rise compared with axles in which practically all the loss is concentrated in the central housing.

Lubricant Circulation Needs Alteration

A feature that suggests itself as capable of improvement is the means used for circulating the lubricant; the present method appears to be exceedingly unsatisfactory at higher speeds and viscosities from the point of view of efficiency. It seems doubtful whether it is desirable to direct a large volume of the oil from the worm to the bearings. The latter might be better provided for by a smaller quantity of oil of lower temperature delivered directly from the sump. A generous sized central housing, insuring an ample supply of lubricant without necessitating deep immersion of revolving parts, would be an advantage.

It will be noticed that some of the ratios are outside the limits of the specifications, but these were standard ratios in which the respective axles were produced, and the manufacturers could not furnish axles with the desired ratios.

An electric cradle dynamometer of ample capacity, used as motor, furnished the power for the tests. To assure satisfactory and more economical operation at low propeller shaft speeds, a standard Class B transmission was used between the dynamometer and the axles, with gear ratios of 5.934, 3.237, 1.766 and 1 respectively. The objectionable influence of the losses in the transmission was eliminated by rigidly connecting the case of the transmission to the field frame of the cradle dynamometer and

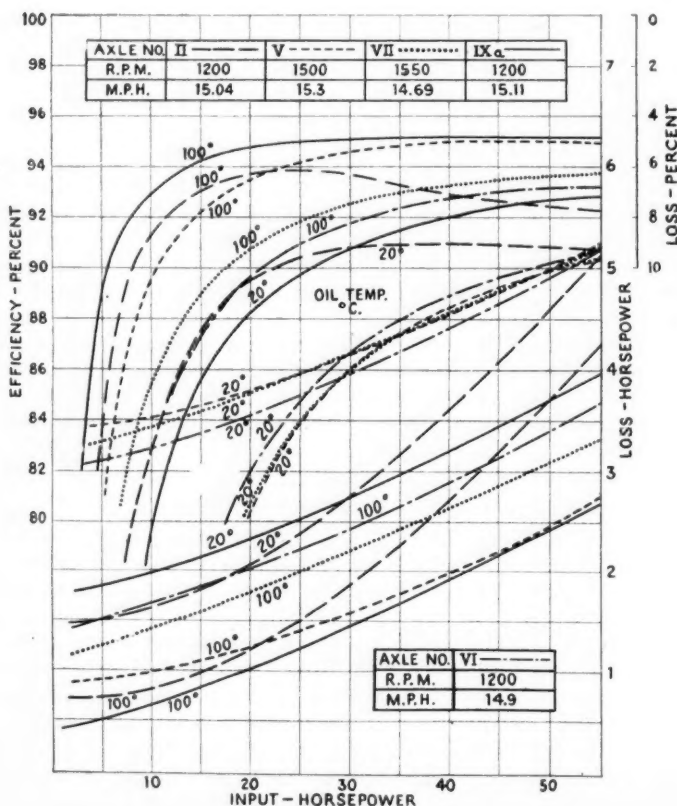


Fig. 5—Total losses and corresponding efficiencies vs. horsepower input at 15 m.p.h.

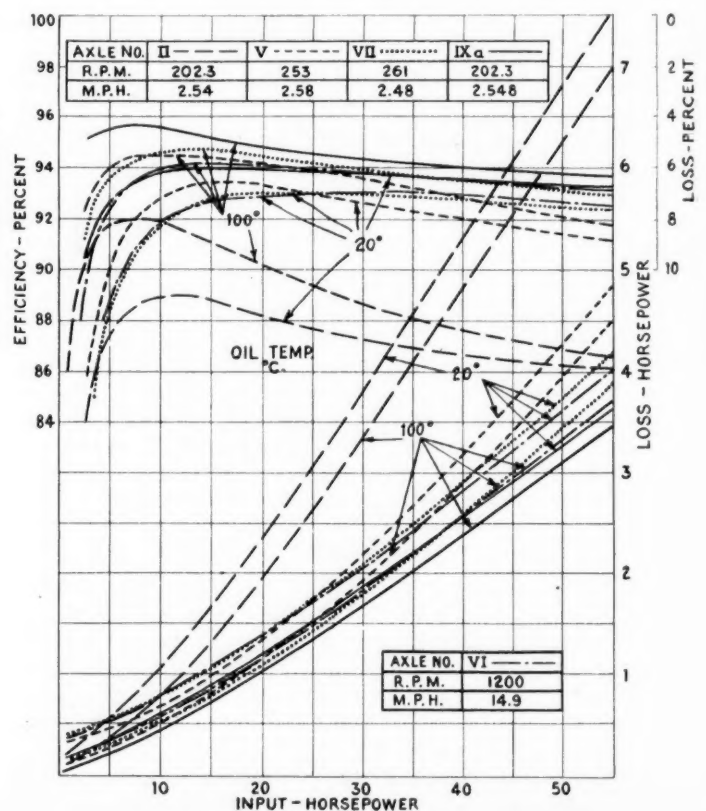


Fig. 6—Total losses and corresponding efficiencies vs. horsepower input at 2½ m.p.h.

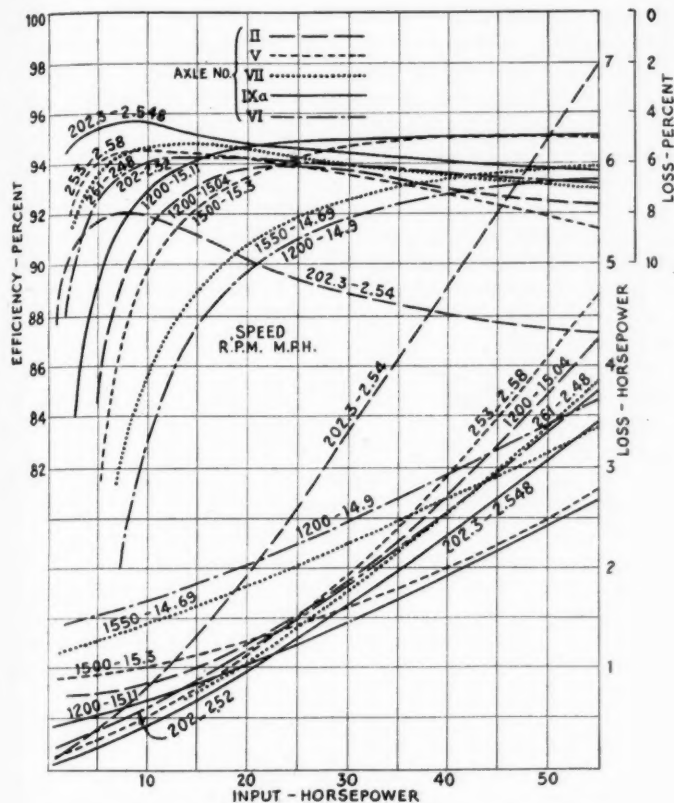


Fig. 7—Relation of losses to input horsepower and corresponding efficiencies at high and low speeds, for an oil temperature of 100 deg. C.

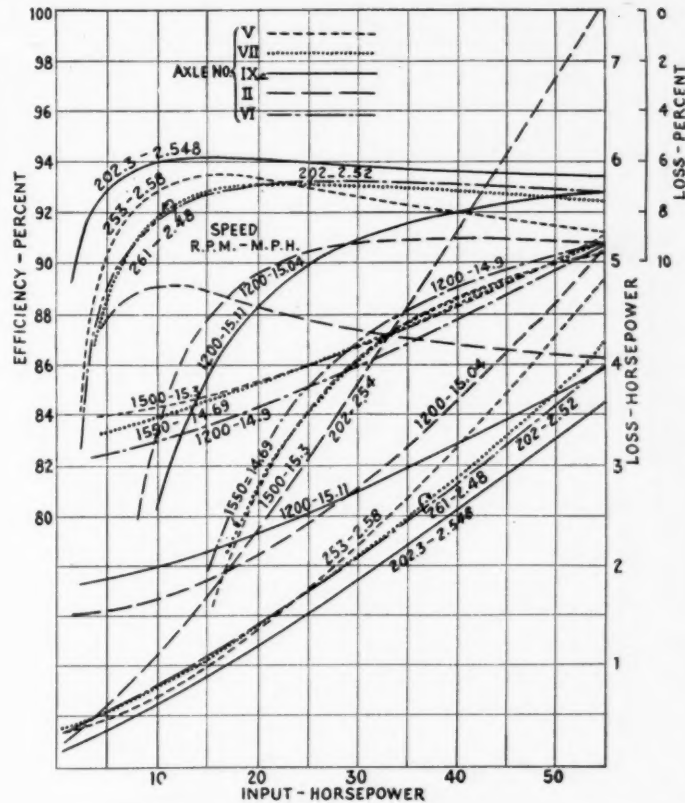


Fig. 8—Relation of loss to input horsepower and corresponding efficiencies at low and high speeds for an oil temperature of 20 deg. C.

the dynamometer shaft to the transmission drive shaft, and by securing a beam to the transmission case for roughly balancing the case. The torque arm of the dynamometer field frame thus indicated the axle input torque regardless of the losses in the transmission. The transmission main shaft and propeller shaft of the test axle were connected by two flexible couplings joined by a very short shaft splined at both ends, whereby ample flexibility and a means of readily disconnecting the axle were secured.

The test axle was mounted on two steel I-beams secured on and overhanging the floor plate, and so spaced that the axles were supported under the spring pads and secured by heavy bolts as shown in the illustrations. These I-beams extended past the dynamometer and carried at their far ends the weighing gear taking the reaction of the brake arms. Prony brakes, substantially constructed of structural steel, were used to absorb the power. A uniform surface with the various types of wheels was obtained by mounting on them standard tire rims as used with the 40 x 6 in. solid tires, and after securing these

by pins and welding, machining them to a smooth surface. Each prony brake was equipped with an upper and a lower pair of flexible steel bands lined with standard brake lining 5 in. wide. The tension on each brake was adjusted by one

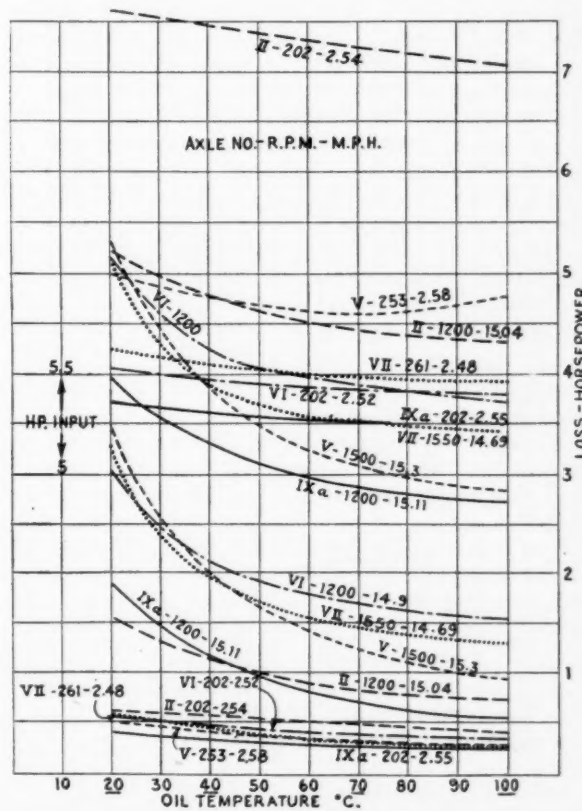


Fig. 9—Relation of total loss to oil temperature at highest and lowest speeds and horsepower input

Table 1
Temperature Rise Run
15 m.p.h.

Axle No.	Input		Time		Temperature Equilibrium, deg. C.		
	Horse-power	Torque in. lbs.			Oil	Room	Rise
I	49.5	2600	2	20	Sump 108 Bear. 107.5	21.5	Sump 870 Bear. 840
II	50	2620	3	30	Sump 101 Bear. 86	21.5	Sump 82 Bear. 68
III	50.5	2640	3	30	Sump 96 Bear. 91	23	Sump 82 Bear. 78
V	50.5	2460	4	00	84	26	56
VI	51	2660	4	20	88	23	72
VII	50	2030	4	15	93	21.5	80
IXa	50.5	2625	4	20	80	24	58

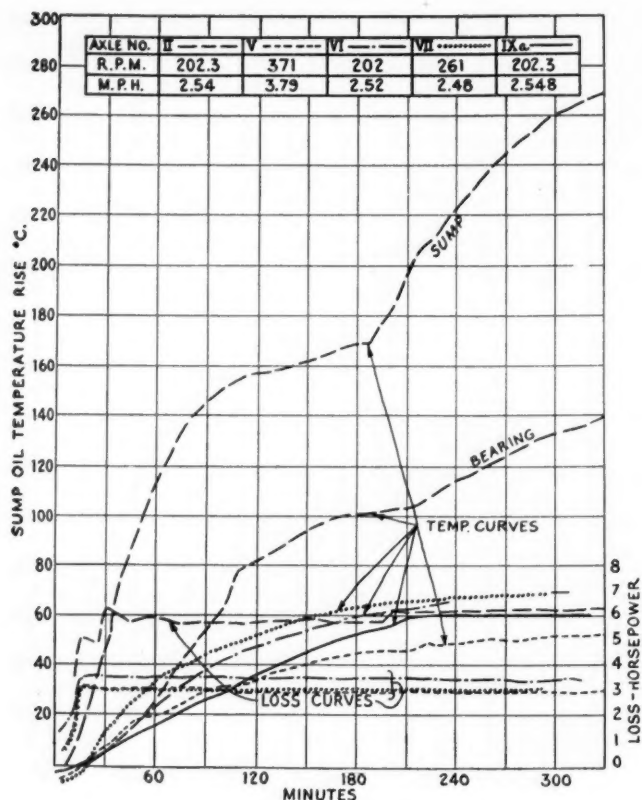


Fig. 10—Results of endurance run

heavy bolt, and means were provided for adjusting and equalizing the loads on the different bands. In order to keep the speed of the two wheels constant, the differentials were locked by filling them with a soft metal. To facilitate the power measurements, the method first proposed by Allen and Roys was used. This consists in the use of a differential beam for balancing the input torque against the output torque. The losses are balanced by means of an adjustable rider weight, from the size and necessary displacement of which the transmission losses in the axle are computed. Referring to Fig. 11, which is a diagrammatic sketch of the test equipment, the main knife edge at A on the differential beam was carried in a separate block, and its position could be readily altered to change the ratio of the two beam ends, as required by the varying reduction ratios of the several axles. The differential beam was supported by the weigh-beam shown at D, and from the net indication of this the input was calculated. Counter weights were provided at several points, and two simple oil dash pots to dampen oscillations of the differential beam and the upper weigh-beam were located as shown.

The heat generated at the brakes was absorbed by water fed into the hollow of the wheel rims, a number of holes being provided for the escape of steam. A sprinkler over each wheel, fed by an overhead water pipe, served for the further control of the brake temperature. Two additional sprinklers, one above and one under the central housing, were used for cooling the sump and bearings, as required. The sump temperature was raised by a plumber's pot and several blow

torches, the flame of which was covered to prevent local overheating of the sump. The temperature of the lubricant was observed by thermo-couples suitably located in the axle and transmission and immersed in circulating oil.

The standard brake drum equipment was left on all axles but the brakes themselves were removed, to avoid any possibility of their rubbing on the drums.

Each axle was run for a sufficient time to "bed in" the bearings, gears and worm, to reduce as far as possible changes in mechanical fits during the tests. In these preliminary runs the axles were run first with gradually increasing loads and then with loads up to about 50 hp., at a speed corresponding to about 8.5 m.p.h., and with oil temperatures ranging up to 100 deg. C. These preliminary runs aggregated several days and gave opportunity to observe such changes in the losses as usually occurred during this period, the losses usually decreasing somewhat at first. The efficiency tests were carried out at speeds corresponding as nearly as convenient to road speeds of 15, 12.5, 8.5, 4.5, and 2.5 m.p.h., based on 40 in. tires.

To ascertain the influence of the viscosity of the lubricant on the losses, the efficiency tests were made at several oil temperatures, the range of temperatures being such that with a slight extrapolation at the lower end it was possible to determine the influence of the oil temperature (and hence of the viscosity) from 20 to 100 deg. C. Two factors must be kept in mind in this connection viz., first that the viscosity of the lubricant used in the tests is very high at low temperatures and that it may therefore be advisable in such a case to use a lubricant of lower viscosity; and, second, that in operation at low temperatures the losses will increase the temperature fairly rapidly. The temperature rise of the lubricant will, of course, depend on the magnitude of the losses, the outside temperature and the heat dissipating capacity of the structure. Data on the temperature rise at constant loads were obtained by tests at high and at low speeds with a constant power transmission of about 50 hp.

Each axle was finally submitted to a low speed (approx. 2.5 m.p.h.) test with high torque, designated as "endurance" run, continued in periods of 5 hr. daily, until breakdown occurred, or was clearly imminent. This run permits of a fair estimate of both mechanical wear and efficiency of power transmission, these being related to each other. Owing to the differences in the ratios of the

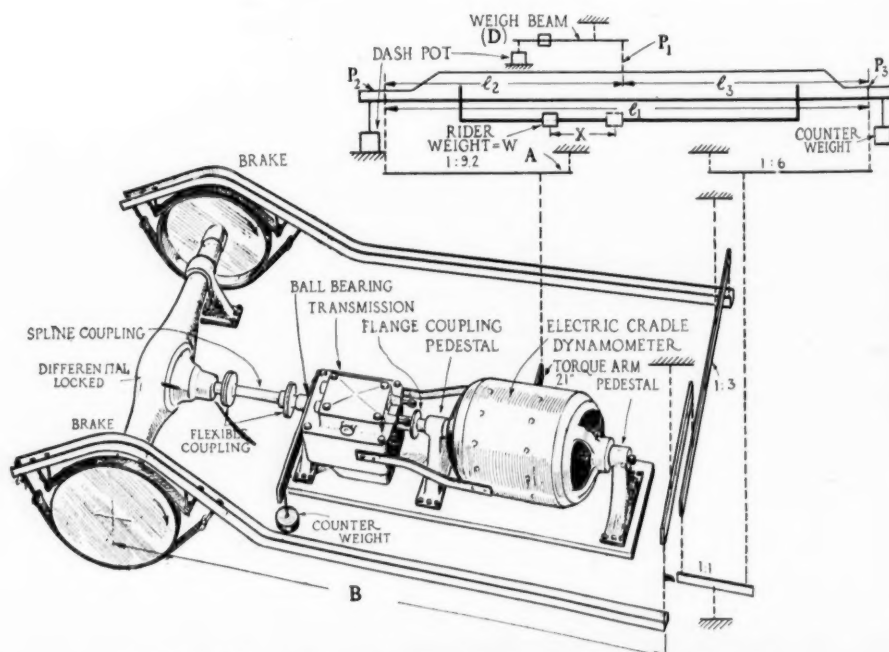


Fig. 11—Diagrammatic representation of testing equipment

various axles and the fact that the conditions of this test differ so much from what is met in actual service, and for other reasons, the periods elapsing before breakdown occurred should not be taken as a direct measure of their relative endurance or capacity. They promised, however, to be of assistance in estimating to some extent the durability and to yield other data of value to the designer.

Test Program

- (1) Preliminary power runs—at 8.5 m.p.h., at temperatures up to 100 deg. C.
- (2) Efficiency tests.
 - (a) At 8.5 m.p.h. at 40 and 70 deg. C.
 - (b) At 12.5 m.p.h. at 40 and 70 deg. C.
 - (c) At 15 m.p.h. at 40, 70 and 100 deg. C.
 - (d) At 4.5 m.p.h. at 40 and 70 deg. C.
 - (e) At 2.5 m.p.h. at 40, 70 and 100 deg. C.
 - (f) A short run at 1.7 m.p.h. at 70 deg. C.
- (3) Temperature-rise run at 15 m.p.h. with constant load of about 50 hp.
- (4) Check run (a) at 15 m.p.h. at 70 deg. C.
(b) at 2.5 m.p.h. at 70 deg. C.
- (5) No-load tests at several speeds and oil temperatures.
- (6) "Endurance" run at 2.5 m.p.h. with constant load of about 50 hp. with observation of the temperature rise in periods of about 5 hours each day until breakdown occurred, or was clearly imminent.

Various reasons caused several departures from this general program. For any given speed, tests at the lower temperatures were made first. In all except the "no load" tests the minimum load was governed by and kept slightly less than that resulting from the weight of the brakes. In efficiency tests at a given speed and oil tempera-

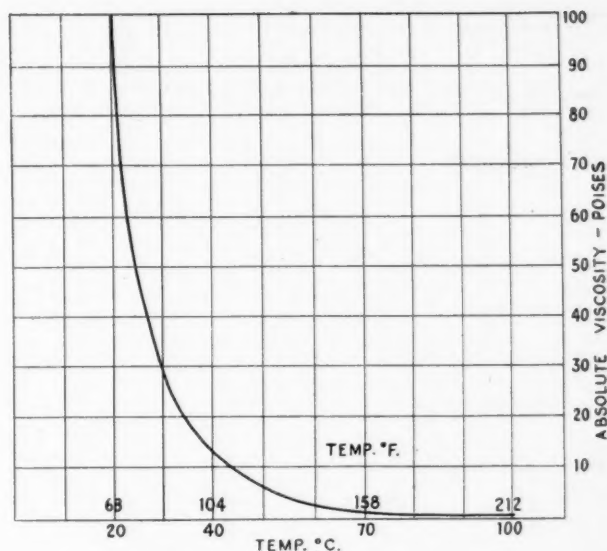


Fig. 12—Variation of oil viscosity with temperature

ture, readings were taken at from five to seven different loads and were repeated at the same loads while descending again to the smallest load.

Government specification transmission lubricant was used in all of the axles during the tests. The relation of the viscosity of this lubricant to temperature is shown in Fig. 12. That part of the curve below 40 deg. must be taken as approximate only.

Overland Announces the Red Bird, New Phaeton Model

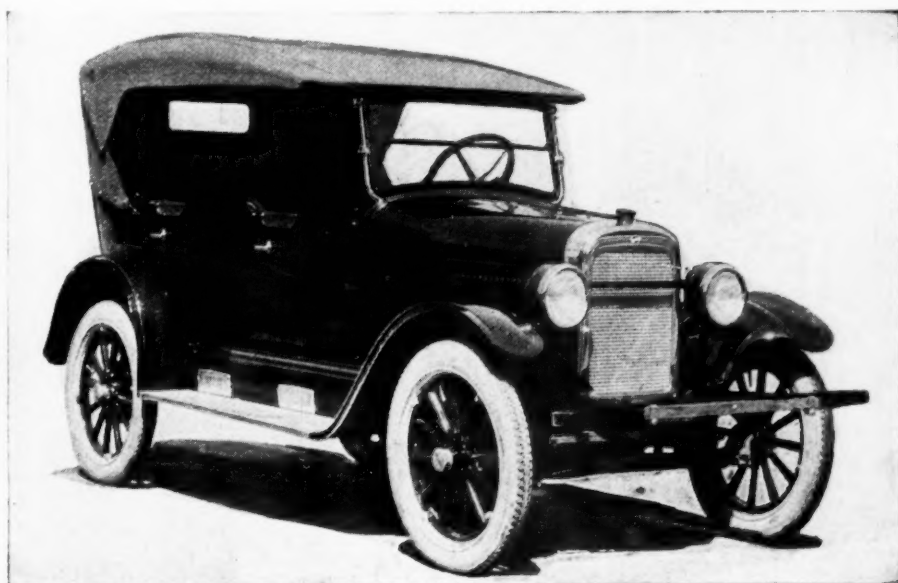
THE Overland Red Bird, a new body on a chassis resembling the Model 91 in general, but with a number of changes, is announced by the Willys-Overland Co. This model is a phaeton finished in Mandalay maroon and is to sell for \$750. It is in addition to the regular Overland Model 91 line, which is to be continued in full.

The new model is considerably larger than the regular phaeton. The wheelbase is increased on this model to 106 in., the Model 91 being 100 in. The same type of

spring suspension is used so that the springbase on the Red Bird is therefore 136 in. The appearance is quite striking, the top being khaki which with the maroon body and nickered trimmings sets the car off very well. The increased length is distributed between the front and rear compartments so that there is more leg and knee room all around.

The engine of the new model has been increased in size from $3\frac{3}{4} \times 4$ to $3\frac{1}{2} \times 4$ in. A higher compression is used and the valve passages and carburetor throat have been enlarged. The piston is slightly longer and of light weight cast iron type. The compression ratio of combustion space to total volume is $1\frac{1}{2}$ per cent lower. The valve clear diameter has been increased from $1\frac{3}{8}$ to $1\frac{1}{2}$ in. These changes give a more powerful engine than that used in the regular Overland models. Aside from these changes and such other alterations that would be necessary in lengthening the wheelbase, the design follows closely that of the Model 91.

Headlamps, radiator trimmings, bumpers, front and rear, windshield stanchion, scuff plates and rear curtain light frame are finished in nickel. A windshield wiper and door grips are included in the standard equipment. The khaki top is made of strong weather resisting material with red bindings and welts and the interior is finished in red Spanish grained upholstery.



New Overland Red Bird which has longer wheelbase and larger engine than the standard model

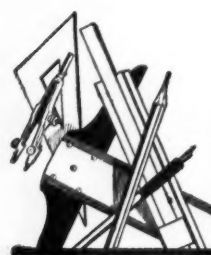
Exports of Cars, Trucks and Tires for

COUNTRIES	GASOLINE PASSENGER CARS								GASOLINE TRUCKS					
	Up to \$500		\$500 to \$800		\$800 to \$2000		Over \$2000		Up to 1 ton incl.		1 to 2½ tons		Over 2½ tons	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Europe														
Belgium	443	\$132,059	53	\$28,254	25	\$28,358	2	\$5,176	350	\$74,759				
Denmark	35	16,257	33	21,986	29	27,341	1	3,684						
Estonia											1	\$1,700		
Finland	85	23,993	5	2,750	11	12,554			76	18,258				
France	1	400			1	1,400								
Germany	1	500	3	1,650	1	1,098	1	2,500						
Gibraltar			2	1,507										
Greece	1	500					1	2,466						
Iceland and Faroe Islands														
Italy	116	31,707			4	5,914	2	4,227						
Latvia	2	780												
Lithuania														
Malta, Gozo and Cyprus Islands	10	2,859			4	4,078								
Netherlands	1	500	2	1,341	7	7,085	5	11,965	1	520				
Norway	50	25,000	27	17,581	100	102,482					3	4,475		
Poland and Danzig														
Portugal	1	400			1	1,140	1	2,100						
Rumania					2	1,934								
Russia	25	10,055												
Spain	227	61,501	58	34,515	86	96,558			210	36,197				
Sweden	7	3,448	86	66,942	104	99,237	13	27,589			6	9,000	1	\$5,018
Switzerland			9	5,068	15	15,440	6	16,089						
Turkey					1	1,200								
Ukraine									35	12,740				
England	164	71,085	385	249,412	289	260,910	8	27,257	4	2,408	15	17,730		
Scotland	1	500												
Ireland	13	5,889												
North and South America														
Yugoslavia, Albania and Fiume														
United States														
Canada	63	23,045	335	210,647	397	423,760	68	162,726	19	14,646	50	77,294	17	39,365
British Honduras														
Costa Rica			11	8,341	1	1,006								
Guatemala	2	747			1	884			2	840				
Honduras	4	1,472			2	2,468			3	1,264				
Nicaragua														
Panama	8	3,113	3	2,050	15	17,538			13	4,632				
Salvador					2	1,754								
Mexico	456	153,254	44	31,308	74	79,557	9	24,786	57	32,726	2	4,154	1	1,500
Newfoundland and Labrador	1	150			5	4,800								
Barbados	2	748												
Jamaica	18	7,025	14	10,345	1	801			15	5,460	3	4,698		
Trinidad and Tobago	5	1,872							6	2,299				
Other British West Indies	15	5,198			2	2,449			5	2,064				
Cuba	257	66,957	54	39,116	36	44,124	12	36,964	12	3,213	2	1,578	1	1,673
Dominican Republic	15	6,094			3	2,832			3	893			1	2,952
Dutch West Indies	6	2,167							2	514				
French West Indies	2	748			4	3,256								
Haiti	5	1,861	3	2,261	1	1,000					6	13,828		
Virgin Islands														
Argentina	75	36,267	235	172,118	123	169,912	7	18,362	1	500			4	15,000
Bolivia					3	3,299								
Brazil	102	29,087	65	37,675	133	137,622	5	16,518	10	2,296				
Chile	48	14,613	2	1,300	16	18,705	1	2,466	58	26,937	2	5,600	3	2,300
Colombia	3	1,162	2	1,329	17	20,613			28	9,832	4	6,742		
Ecuador					4	4,767								
British Guiana	6	2,623												
Dutch Guiana	8	3,017												
Paraguay														
Peru	16	5,938	6	4,375	13	14,300			27	13,946			1	3,850
Uruguay	223	67,457	55	31,809	14	17,369	2	5,943	50	12,768				
Venezuela	65	24,560	8	4,040	17	19,059	3	6,999	10	3,640	1	5,118	1	1,983
Asia														
Aden														
British India	59	28,966	40	28,499	23	23,121			5	5,657	11	13,016	3	6,689
Ceylon			11	7,271	2	1,800					1	1,182		
Straits Settlements			33	18,689	18	18,894								
China	10	3,408			18	18,628								
Chosen			1	600			3	11,010	25	9,100			3	27,000
Java and Madura			87	54,408	33	33,793					3	3,264		
Other Dutch East Indies					3	2,641								
Hejaz, Arabia and Mesopotamia					1	957								
Hongkong			2	1492	8	8,093	1	3,500			2	5,200		
Japan	73	22,887	15	9,858	18	19,101	7	23,292	101	35,267			2	10,000
Kwantung														
Palestine and Syria			11	7,765	39	45,796	1	3,209						
Persia	3	1,067												
Philippine Islands	41	15,444	10	7,700	30	37,599	4	12,083	32	11,200			1	2,000
Siam			3	2,261										
Oceania														
Australia	199	88,614	845	555,876	456	467,441	35	93,728	89	88,515	174	230,922	24	48,101
British Oceania			2	1,507										
Fiji Islands														
French Oceania														
New Zealand			218	145,124	216	183,538	11	25,129	12	8,240	15	25,583	2	6,000
Other Oceania													8	11,413
Africa														
Belgian Congo									6	2,184				
British West Africa	15	6,300	5	3,768	15	16,299			26	13,974	5	6,300		
British South Africa	18	8,369	116	84,034	176	174,578								
British East Africa	9	3,997	1	550	10	10,043	1	2,121	5	6,162				
Canary Islands	2	1,000	4	2,360	13	15,098								
Egypt	1	463	3	2,261	4	3,896			2	2,560			1	1,421
Algeria and Tunis														
Other French Africa	21	7,487												
Liberia														
Morocco	24	9,020	11	8,315	2	1,624			2	840				
Portuguese East Africa														
Other Portuguese Africa	5	2,250									6	1,700		
Spanish Africa					3	4,500								
Other Countries														
Total	3,068	\$1,045,880	2,918	\$1,930,058	2,652	\$2,746,044	210	\$551,889	1,302	\$467,051	322	\$439,084	74	\$186,265

February, 1923

Canadian Exports

ELECTRIC VEHICLES		PARTS	TIRES						PASSENGER CARS		TRUCKS		PARTS	COUNTRIES
No.	Value		Casings		Solid		Inner		No.	Value	No.	Value		
No.	Value	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
		\$36,215	852	\$10,890			421	\$1,074	22	\$14,734			\$263	Europe
		452,332	4,841	63,608	89	\$2,602	5,903	9,140					13,414	Belgium
		442	6	110			8	45						Denmark
		4,428	158	2,679			186	555						Estonia
		367,950	41	1,065	24	501	335	671						Finland
			264	3,882										France
		322												Germany
		1,468	689	7,186	21	604	294	505						Gibraltar
		35	10	80			33	60						Greece
		5,038	1,850	23,642			745	1,136						Iceland and Faroe Islands
		418												Italy
		223												Latvia
		10	28	459					3	1,657				Lithuania
		3,652	1,357	17,990			906	1,370	10	9,710			14	Malta, Gozo and Cyprus Islands
		9,458	3,987	62,487	73	3,215	3,357	6,814	5	5,112			1,134	Netherlands
		845	100	1,019			50	90	1	986				Norway
		2,816	90	758			10	14	1	794				Poland and Danzig
		440												Portugal
														Rumania
														Russia
		514,933	1,166	20,583	492	13,185	744	2,018	84	74,016	5	\$1,760	30,298	Spain
		21,904	7,474	96,657	4	229	3,816	5,543	16	14,362			1,206	Sweden
		1,306	376	5,979			166	466	2	2,144			16	Switzerland
		55	15	266										Turkey
		4,241												Ukraine
		339,942	17,664	182,340	1,715	36,783	11,688	17,805	2,128	1,425,374			17,349	England
		27	527	3,312	110	2,476								Scotland
		71,030	344	2,818			525	691						Ireland
		1,045	79	1,260										Yugoslavia, Albania and Fiume
									2	2,250			7,691	North and South America
														United States
4	\$6,649	1,362,212	5,663	60,492	210	6,477	3,516	4,115						Canada
		166	38	440			36	64						British Honduras
		1,176	105	1,821			120	251						Costa Rica
		1,099	4	100									13	Guatemala
		2,334	78	1,439			60	94						Honduras
		215	41	830			72	178						Nicaragua
		5,870	764	9,962	18	600	429	722						Panama
		1,603	222	6,073	6	213	90	294	3	1,523			13	Salvador
14	7,615	68,765	16,610	169,816	132	3,256	6,604	12,157	16	17,020			8	Mexico
		819	27	398			25	42	1	428				Newfoundland and Labrador
		1,203	83	1,335			75	120						Barbados
		8,441	366	4,107	109	2,120	303	547						Jamaica
		4,323	405	2,222			218	438						Trinidad and Tobago
		3,697	195	1,955	7	117	288	394	18	11,979			72	Other British West Indies
		68,055	5,936	66,898	493	17,101	2,094	4,438	14	11,535			139	Cuba
		4,220	262	3,748	29	595	660	960						Dominican Republic
		758	150	1,569			128	220						Dutch West Indies
		1,112	127	1,289	12	223								French West Indies
		2,675	124	1,265			87	130						Haiti
		240	51	501			72	109						Virgin Islands
1	5,459	658,393	12,893	131,282	62	1,830	12,526	18,238	323	164,503			22,650	Argentina
		454	130	2,092			80	192					55	Bolivia
		159,749	3,397	32,977	9	163	1,583	1,766	20	16,874			7,326	Brazil
		18,537	1,700	20,382	22	748	634	1,293					13	Chile
		10,544	1,069	12,998	10	188	1,044	1,804					78	Colombia
		320	54	1,725	12	369	32	167						Ecuador
		361	2	23	14	246			4	2,441			17	British Guiana
		133	80	636			16	20						Dutch Guiana
		117											27	Paraguay
		12,772	1,328	19,484	31	750	755	1,462						Peru
		16,334	4,017	53,280			928	1,409	16	13,133			360	Uruguay
		3,206	384	5,340	4	54	626	1,073	5	4,769			266	Venezuela
														Asia
		528	102	913			114	180	5	1,442	2	668	10,606	Aden
		28,776	2,103	21,932	93	2,086	1,137	1,737	182	71,954	63	21,402		British India
		1,767	1,085	8,542	127	2,253	286	341	22	10,726	24	8,106		Ceylon
		13,111	2,041	18,117	215	4,672	1,356	1,884	86	28,432			2,777	Straits Settlements
		10,104	588	8,692	14	296	354	698	43	30,855			243	China
		88	15	158			12	25						Chosen
		9,108	2,065	22,000	321	8,704	1,140	1,313						Java and Madura
		4,701	77	1,352	15	590	58	128	125	45,931			12,579	Other Dutch East Indies
		1,573	349	2,713			244	294						Hejaz, Arabia and Mesopotamia
		2,194	109	2,564	18	233	70	81					10	Hongkong
		37,573	4,311	50,200	912	16,830	1,620	2,794	10	6,369				Japan
			100	988			235	370						Kwantung
		7,029	330	3,889			182	303						Palestine and Syria
		144												Persia
		11,558	3,841	42,810	1,297	26,346	3,458	6,631						Philippine Islands
		54	32	319					7	3,148				Siam
														Oceania
		123,598	4,865	83,844	907	25,371	1,973	3,709	1,504	557,638	270	95,755	33,832	Australia
		428	23	233	1	17	20	46					352	British Oceania
									12	3,284				Fiji Islands
		744	40	525	6	230	38	74						French Oceania
		31,154	7,060	93,752	214	6,371	3,347	6,539	583	249,948	48	16,212	1,606	New Zealand
		970	16	256			63	119						Other Oceania
														Africa
		543												Belgian Congo
		10,296	64	790			74	133	10	2,424	2	668	2,176	British West Africa
		29,426	3,412	34,001	2	63	2,861	4,993	355	144,301	17	5,678	26,192	British South Africa
		3,703	213	2,109	1	75	188	416	29	11,539	7	2,338	2,429	British East Africa
		1,081												Canary Islands
		2,327	305	2,807			23	48					944	Egypt
		21												Algeria and Tunis
		3,838	4	30			4	8						Other French Africa
		15												Liberia
		1,459												Morocco
		171	62	1,006			124	269						Portuguese East Africa
		4,318	95	1,395	37	955	8	47						Other Portuguese Africa
			56	823	21	355								Spanish Africa
									1	1,010				Other Countries
19	\$19,723	\$4,602,878	131,586	\$1,532,309	7,909	\$190,101	81,277	\$134,172	5,668	\$2,964,345	438	\$152,587	\$196,168	Total



The FORUM



"Social Rejection" Not a True Cause for Trading Cars

*Engine repair work remains at bottom of trouble.
Factory planning should be extended to garage routine.*

Editor, AUTOMOTIVE INDUSTRIES:

WHEN the editor of a dealer's paper published a reply to a production man's article, one must pick his steps carefully if he intends his reply to burst into print. Knowing both Louis Ruthenburg and Clyde Jennings personally, and knowing the experience of both, I hazard this attempt to strike for a happy medium between the two extremes.

Ruthenburg's article on "Poor Service Is Largely Responsible for Used Car Problems" analyzes the situation as it exists the country over. He does neglect to credit a few exceptions, and he looks to the car manufacturer to lead in the correction of the situation, whereas the better service movement has been in slow progress among the dealers for some time. It is best that it continue along its present course than that it wait for the manufacturers to take up the lead.

Jennings justly defends such large distributors as Packard and Oakland in New York, Hudson in Chicago, and Pence of Minneapolis from Ruthenburg's general accusation of lack of foresight and absence of business ability.

The metropolises of New York, Chicago, St. Louis and Minneapolis are the sources of Jennings' idea of the way service problems are met. These points are within the manufacturing belt, where factory and manufacturing influence would naturally be strongest, and where men well versed in the best mechanical and management problems would most likely become associated with automobile distributors.

Such a picture is not typical of conditions as a whole. The equipment and management found in a leading distributor in Chicago is quite different from the service found on a trip through a State such as Kentucky.

Had Jennings' idea of "social rejection" of cars appeared during the war, when manufacturers were so earnestly striving to reverse the automobile from the luxury idea, it would have been lamentable. Even today it is inaccurate and an unfortunate alibi. The social rejection theory defeats itself. None of the cars that are produced in quantity have changed enough in the past five years to offer inducements for social rejection. Exceptions to this are wealthy people, and those imprudent individuals that look to the sporting rather than the practical side of automobile ownership.

There are many who advance social rejection in order to cover other reasons for trading in a car. I felt that the dealer I last purchased from had betrayed me when Jennings quoted the remarks of "many a man" that turns in a used car which is sweet running. I used verbatim the remark: "I would like to have this old engine in the new bus." Two years after using those words I find reason to believe that they were taken by the dealer at

face value. All dealers receive such remarks. The real reason for making the remark is to get an exceptional allowance for the old car.

The average car owner trades in his car because he has lost confidence in it. After a few series of trips to the service garage the frame of mind of the owner has undergone a change. When he starts out on a trip the question of whether or not the car will fail him en route flashes through his mind. As mileage piles up he becomes more and more convinced that he had better trade his car in for a new one before it becomes further depreciated and before he has to make another series of trips to the garage.

I say "series of trips" because after the first trip it is usually necessary to go back a time or two to undo some of the repairs or to collect the equipment the garage mechanic forgot to put back in the car. When the trade-in time finally does come, such an average individual will talk about social rejection and lie about what a sweet running car he is reluctantly letting the dealer have.

Factory Methods in the Garage

The gem of Ruthenburg's article is his plea for the extension of factory planning as to layout and routine to garage work. Jennings' paper periodically carries much material, with the same basic thought. He shows inconsistency when he implies that the same idea of management will not work in a garage, because a garage is not building one article, but is handling 100 to 300 different jobs a day.

Ruthenburg had in mind not an assembly line, but departments such as shop maintenance and tool room of a factory where the scope and variation of work is many times greater than in the most versatile of service stations.

Paint and Engines

To one who has studied the garage situation, it is always exasperating to hear such frequent reference to paint and trimming departments, and so little about engines. If there is any one service that can be obtained outside of the garage, that is new paint and trimmings.

When a car owner seeking paint is referred to a paint shop he can take no exception. There is nothing inconsistent about it. When his engine does not function properly he does expect the dealer not only to repair it, but to restore its original performance. New paint does sell used cars; in fact, that is usually the extent of the newness of the car. Painting does pay the dealer a profit. I do not seek to abolish paint departments, but merely to alter their rank in importance as a dealer's service.

If a prospect for a used car felt assured that the engine was renewed he would be willing to hazard the condition

of the body, transmission, and axles. It is the engine that he questions, because it is the engine that does the most work, and he knows it is subject to the greatest wear. Very few garages are equipped with machinery or with mechanics capable of renewing the engine. A scant handful of dealers renew engines themselves. In many cases they pass on the extremely worn engines to outside machine shops, obtain a commission on the work of the machine shop and build up a charge that is unwarranted by the results obtained.

As a whole, engine repair is not being taken care of today. Capacity, ability and equipment for engine repairs is a requirement that is new. It is strictly automotive and as such it is a dealer's problem and responsibility.

When the dealer concentrates on engine repairs and develops this end of his business, he will have need for just such suggestions as Ruthenburg gives in his article.

GEORGE M. MEYNCKE,
The Osterlein Machine Co.

Double Piston Engines

Editor, AUTOMOTIVE INDUSTRIES:

Reference being had to an engine of the type in which two pistons operate in one cylinder, A maintains that at the point of highest compression and ignition, the crank connected to one piston should be arranged to have advanced about 50 deg., the other being on dead center, to attain the highest power and efficiency, the reason given being that with this arrangement maximum leverage and pressure would occur at about the same time, and that an explosion in a gas engine is analogous to a blow delivered by a hammer.

B dissents from these views and stands for the usual 180 degree crank arrangement.

Please discuss the theory briefly.

ROYAL N. RIBLET.

If the two pistons are connected to cranks so arranged that, instead of being opposite or at 180 deg., one of them is 50 deg. ahead of the natural position, the maximum compression is not attained while one crank is in the dead center position and the other 50 deg. past it, but while one is 25 deg. ahead of the dead center position and the other 25 deg. past it. If the spark occurred at this point the pressure of the explosion would be used to very poor advantage, because one piston would have to move in a direction opposite to the direction of the gas pressure.

The best arrangement is undoubtedly to connect the two pistons to cranks directly opposite each other. Then the two cranks are equally affected by the pressure of the explosion and by any change in the operating conditions, such as advancing the spark.

The explosion in a gas engine cylinder may be compared to the blow of a hammer, the comparison being perhaps best if the hammer blow is considered as directed onto a nail in very soft material, so that the nail is forced down several inches under a single blow.

The objection to the crank type of mechanism for reciprocating engines, that at the time of maximum pressure in the cylinder the crank has no effective lever arm, has often been made, but is of very little moment. The crank is a very efficient means for converting reciprocating into rotary motion, and practically all attempts to displace it, as, for instance, by means of a wobble plate, have failed.

It would be an advantage, of course, if the piston had a considerable forward speed from the moment at which ignition occurs, but effective ignition, which is associated with an exceedingly rapid rise in cylinder pressure must occur at the moment the gas is compressed to the least volume, and there seems to be no mechanism which permits of meeting these two requirements, that is, ignition at the time of maximum compression and very rapid expansion of the combustion chamber from the time ignition occurs.—Editor.

Proportion of American Cars in Buenos Aires Gaining Steadily

THE latest bulletin of statistics issued by the Municipality of Buenos Aires gives the following figures relative to motor vehicles purchasing licenses within the city limits of Buenos Aires during the year 1922:

Private cars	6,132
Taxis	9,051
Trucks	1,842
Motorcycles	556

and 60 de luxe cars for weddings and funerals. No mention is made of omnibuses which have probably been classed as trucks.

While no figures are available on this subject it is evident to the careful observer that of the private cars owned in Buenos Aires considerably over 75 per cent are products of American factories. This percentage is increasing month by month and if the present proportion of sales continues the time is not far distant when at least 90 per cent of all passenger cars in Buenos Aires will be of American manufacture.

The majority of the European cars now in use are old models and as these cars are discarded the owners in many instances purchase American machines. It may be said, however, that the percentage of European cars to the total of automobiles in use is considerably higher in Buenos Aires than in any other part of Argentina.

Of the 9051 taxis now operating in Buenos Aires about 50 per cent are of European make, due to the fact that

prior to the war nearly all taxis were imported by large taxi operating companies from European factories, principally from those of France.

At the present time the tendency is to put more second-hand American automobiles in the taxi service. With the exception of Fords, it is very seldom indeed that new cars are put on the streets. However, taxi owners furnish a first-class market for the sale of second-hand machines and this enables dealers to take back old cars in part payment for new ones.

The majority of trucks used in Buenos Aires range from 1 to 3 tons. The Ford ton-trucks make up about one-half of the machines used. However, heavier trucks with trailers are becoming more popular especially with factory owners, and with some of the large import and export firms, lighter trucks retaining their popularity with retail houses as delivery vans. The figures of the Municipality make no mention whatsoever of trailers.

Although no mention was made by the Municipality of passenger omnibuses in operation, the writer is of the opinion that there must be from 50 to 75 of these on the streets, the majority of which are Ford ton-truck chassis with locally built bodies.

The de luxe cars owned by undertakers and caterers for renting at funerals and weddings are nearly all of European make.

The majority of the motor cycles in Buenos Aires have been turned out by American manufacturers.

Machinery Kept at Maximum Standard Safeguards Quality of Output

Frequent adjustment and rebuilding made necessary. Tuning up largely neglected in 1921. Personnel and production management responsible. Precision work depends on accurate workers, controlled factory conditions and maintained equipment.

By Harry Tipper

THE automotive industry in the comparatively short time of its development has entirely revolutionized old ideas of accuracy in machine work and the tolerances which can be used in the ordinary course of manufacturing. Fits which could only be secured by slow processes and hand assemblies a few years ago, can now be secured because of the precision of the machines and the manufacturing control of the operations growing out of the necessities of the automotive business. Engineers of the automotive field, manufacturers of parts and machine tool makers have combined to produce accuracies of operation which were previously confined to the few small businesses, and very precise necessities of manufacturing.

Because of the required emphasis upon this accuracy and its relation to the problem of speed and usefulness in the automotive vehicle, it would not be surprising to find the situation somewhat overemphasized in certain places. There are many difficulties even where the machines are very precise and the manufacturing conditions are controlled to a reasonable extent. The automotive industry has been obliged to train mechanics on machine work with comparatively great rapidity, as there were not enough mechanics to make a dent in the business when production began to assume a considerable volume.

GREAT accuracy depends to a considerable extent upon the knowledge of the worker. An inaccurate worker can make it impossible to secure accuracy out of a precise machine. With the rapidity of movement in the automotive factory, the necessity for quick gaging with the dial, block or snap gage, and the pressure for production which has existed most of the time for a number of years, the workers and inspectors must be both quick and alert if the accuracy is to be maintained to the limits of physical possibility.

The physical conditions limiting the possibility of accuracy in tolerances on machine work, are the variations in the temperature of the shop at different points in the operations, variations in the temperature of the oil or

lubricant, variations in the alertness of the worker, and variations in the condition of the machinery.

WITH the constant high speed work, the pressure of production, and the rapid wear and tear, machines must be adjusted very frequently if maximum accuracy is to be secured.

There are certain limits beyond which it is impossible to maintain uniform temperatures on work on account of the surrounding atmosphere, variations in oil and the condition of machines. Certain of these variables will always exist to some extent. Any tolerances which come within limits sufficiently fine to be affected by small variations in temperature or small variations in machine conditions, are beyond the physical possibility of maintenance and will, and should, be discarded as experience develops the difficulty.

In the manufacture of ball bearings, gears, and some of the other parts where extreme accuracy is necessary, the conditions of manufacturing must be governed to as close a variation as possible, in order that the expressed tolerances shall be within the small limits demanded by the conditions of

manufacture and sale of the product.

Accuracy, of course, is expensive. It is much more difficult to keep the manufacturing conditions in the shop so that the tolerances can be kept within exacting limits than it is to reduce broad tolerances. No particular care is necessary in the manufacturing conditions in order to secure tolerances in hundredths, but the finer accuracy extends the supervision, the maintenance of the equipment, the control of shop conditions, and the selection of the workers, increasing at each step the cost of maintaining such a degree of accuracy in the work.

Of course, tolerances are not only a measure of present expectation of performances, they are also a standard which it is desirable for the shop to reach if possible, so that the tolerances should always represent the maximum accuracy to be secured under the manufacturing conditions of the product and the price to be secured for the product.

PRODUCTION methods in the past have been concerned largely with turning out as useful and comfortable a product as possible at maximum speed, but the production question is changing. The future will demand a limitation of cost of operation while securing a maximum practical accuracy at this pre-determined figure.

Harry Tipper discusses the problem in this article. He shows that a high degree of accuracy in production depends largely on maintenance of equipment and that this element must be tackled before long if standards are to be maintained. Tipper also points out the various factors which will come up for consideration and methods of procedure.

As a matter of logical manufacturing consideration, the tolerances to be demanded of the production department should be analyzed in regard to the following factors:

- (a) The maximum physical possibility of accuracy under the average variation in manufacturing conditions at the particular plant.
- (b) The economic possibility of tolerances under the desired cost of the operations.
- (c) The practical necessity of the tolerances under the conditions of use.

THE production question which was concerned primarily with making the product as useful and comfortable as possible, and of producing it at the maximum speed, has changed sufficiently so that the future will demand a limitation of cost of the operation and the production man will be required to secure the maximum practical accuracy at the pre-determined cost allowable for the operations.

In analyzing the requirements of manufacturing in connection with the product, therefore, the tolerances for different parts of the unit should be determined from the standpoints of practical necessity and use, so that more money can be spent on securing a high degree of accuracy where it will be particularly valuable, and less money be spent in attempting a high degree of accuracy where such accuracy is not of particular importance.

It is obvious that the demands for accurate work in connection with the different parts of a given unit, such as the car, truck or tractor, vary over a considerable percentage of necessity. The accuracy of bearings, particularly ball and roller bearings, must be maintained to a very high degree, otherwise the value of the bearing itself would be lost to some extent and the difficulties of assembly enormously increased. These bearings cannot be accurate without a similar degree of accuracy in the shafts and gears. The degree of accuracy required on other parts is not perhaps as great as these, and the tolerances required in fitting the less important parts may be adjusted somewhat without affecting the usefulness of the machine to any important degree.

The work which has already been done gives an excellent foundation for further analysis of tolerances in relation to factory conditions and the requirements of the product, so that the maximum degree of accuracy is maintained under practical conditions of operation and under the cost requirements imposed upon the manufacturing department by the condition of sale.

BY this time we have accumulated a sufficient experience, in the automotive field, to enable the engineer to standardize with a considerable degree of confidence upon definite limits of accuracy in connection with the given parts of the work. All this, of course, depends upon the maintenance of the equipment by the production department. The equipment in the automotive factory is not in the best condition to maintain the highest degree of accuracy compatible with the requirements of the products, and the limitations of cost. Much of the equipment was used to the limit in the latter part of the war and afterwards—except for a part of 1921—has been used to the maximum capacity.

Constant adjustment and rebuilding make it possible to continue precision work for a certain length of time with this machinery, but the required adjustment must be made more frequently and the servicing of the equipment involves more time and expense as general wear and tear becomes more obvious.

No very large amount of tuning up was done in 1921 despite the time available in the production department for such work. A considerable amount of repairing and

rebuilding was accomplished and the tolerances have been maintained fairly well by more frequent adjustment. Nevertheless, in some shops standards have been reduced inevitably, on account of the condition of the equipment and the impossibility of maintaining previous standards in the face of depreciation in the machinery itself.

The industry found itself in financial difficulties in 1921 which made it impossible to devote the money to the replacement of worn-out equipment, and it was necessary to compromise by rebuilding and the more frequent adjustment.

The next period of somewhat lessened production should find the factories in such shape that a more extensive plan can be undertaken for bringing the equipment up to the maximum standard under the conditions of manufacturing and the requirements of the price. It is obvious that this element in the maintenance of maximum practical standards must be tackled before very long, as it is not possible to reduce these standards materially without injuring the comfort and usefulness of the product to the general public.

THE three conditions, accurate workers, controlled factory conditions and precise machinery are necessary for the maintenance of these standards so that the product will be as it should be when it reaches the user.

The first is a matter of factory personnel work and particularly affecting the employment office and the apprentice shop.

The second is a matter of engineering analysis and equipment in controlling the temperatures and conditions surrounding the operations, and the third is a matter of adjustment, repairing, servicing, and new machinery.

None of these factors can be neglected, and they must all bear a definite relation to the necessity for accuracy in the product and the limitations of cost in the operations.

Madrid Show a Big Success

THE city of Madrid has just held its first automobile show. Absence of shows in the past has been due to lack of a suitable exhibition hall. This year the completion of a large ice palace furnished the necessary quarters.

The show committee had considerable difficulty in bringing the exposition to a successful opening due to dissension among important Spanish automobile interests. As a result of the trouble several well-known cars were not exhibited.

Among the American cars displayed were Packard, Hudson, Essex, Studebaker, Chevrolet, Moon and Gray. Ford, Dodge, Cadillac and several other cars well known in the Spanish market were not shown. Altogether there were twenty-six exhibitors covering local, French, Italian and British products. In addition there were many accessories shown and several motorcycles.

The automobile buying public is centered largely in Madrid and this show will undoubtedly create a sales stimulus. This should be a good year for the automotive industry. There have been some hardships in the South due to the British raising duty on fruits, thus reducing an enormous export market.

Prices have been slashed to such an extent that a car need no longer be considered a luxury. In relation to prices for commodities the automobile is exceptionally low. With the stimulus of the present show and the increasing competition between rival manufacturers the year promises good business.

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The Non-Stop Flight

AERICAN army pilots and an American plane have spanned the continent in a non-stop flight.

All honor to the men and the machine!

Another record has been hung up for aviation in the land where it was made practicable. The internal combustion engine has scored another triumph and the automotive industry, which designed the Liberty engine, rejoices.

Prospects for successful commercial aviation in this country have been materially brightened by the achievement of Lieutenants Kelly and Macready. The significance of the performance, aside from its sensational features, lies in the practical demonstration given of powerplant reliability.

The Liberty engine used in the record-making plane embodied only slight modifications from the stock model; modifications which can readily be reproduced in other powerplants of this type. The plane itself was not radical in design.

In other words, the equipment with which the flight was made represents simply the result of steady development and constant refinement in design practice. Thus the flight stands as a definite step in progress and in no sense as a freak performance.

The plane is a Fokker F-4 model. It was designed and built by Fokker and was delivered to the U. S. Army Air Service in March, 1922. This model has a cabin designed to carry ten passengers. A fuel tank carrying 185 gal. was installed in the front part of this cabin area and a 410-gal. tank was placed in the wing, between the front and rear spars. These added to the normal capacity of 120 gal., gave a total fuel capacity of 725 gal.

Slight modifications were made in the exhaust pipe, separate control levers were installed in the cabin to permit control of the plane while the operators were changing places. Engine modifications also were minor in character.

To predict coast-to-coast commercial service at once probably is premature. Ultimately it is certain to come. That a flight of this duration can be made safely, however, indicates excellent commercial possibilities almost immediately for lines operating over shorter distances. It teaches lessons of value for immediate commercial application.

Active government support of commercial aviation development in this country should be hastened. The sensational transcontinental flight shows clearly the wide possibilities that lie ahead and helps to fix public attention on them, thus insuring widespread support for governmental measures designed to help the new industry.

Tackling the Traffic Problem

MANY accident statistics quoted today do not take into consideration the enormous increase in the number of vehicles in operation on our highways. It is obviously inaccurate to make statements regarding increase in accidents without using growth of registrations as a measuring stick.

Figures published by the National Bureau of Casualty and Surety Underwriters show that fatalities are not increasing at the same rate as registrations taking the country as a whole and the same holds true in New York City, where the traffic problem is extremely complex.

Our ideas of traffic and the methods of handling it are largely hang-overs from pre-motor vehicle days. The problem has stolen upon us unawares and we have been caught unprepared. In short, we are handicapped by lack of perspective.

The motor vehicle traffic problem is totally different from that of the horse-drawn vehicle.

Before new systems are adopted there is need of much analytical work. Accident causes must be determined with great accuracy and time worn ideas must be cast off in the light of new material furnished by these studies. That a beginning has been made is evidenced by the work being carried on in New York City. The problem can be solved but it takes time and new ideas based on fact.

New Ideas Needed in Financing Retail Sales

MOTOR vehicle sales on the time payment plan have been largely responsible for creating a market which seems to have no bottom. No one can estimate accurately how much smaller the volume would have been if all purchasers had been compelled to pay cash, for it undoubtedly is true that a great many buyers who take advantage of credit facilities would write their checks for the entire amount if they could get a car or truck on no other basis. This class of purchaser constitutes only a comparatively small percentage of the whole, however.

Time sales more than justify themselves when credit risks are sound and in spite of their admitted faults the industry owes a debt of gratitude to the finance companies which have made them possible. Selling anything on credit to anyone who is not a good risk is an economic sin, but it must be confessed a sadly large number of motor vehicle dealers are terrible sinners in this respect.

Determining who is a good credit risk is a tough job at times. It's about like trying to determine from the general architecture of a frog how far it can jump. Perfectly good sales sometimes are lost by undue caution, but it doesn't hurt nearly as much to lose the discount on the sale of a car as it does to lose nearly the whole purchase price.

Most manufacturers have taken little interest up to this time in the retail credit problems of their dealers. They get cash for their products and the dealer or the finance company is the goat. Time sales are here to stay, however, and they may be forced sooner or later to take the dealer's financial operations more to heart.

Some people are reluctant to concede that Henry Ford ever has or ever has had an idea since he evolved the mechanism which has made his name one of the best known household words. Maybe he hasn't, but some one in his organization is constantly working out little schemes which help to keep the wolf from his door and the result is the same for he gets the profit. No man whose head is solid from the ears up can be as successful as Henry Ford has been.

His adaptation of the Christmas savings plan for the sale of automobiles is a case in point. His dealers and the banks do most

of the work, but his organization originated the idea and put it over. Everybody profits—dealers, banks and Henry Ford. When the plan really gets under way it will roll up orders like a snowball.

The idea isn't flawless, of course. Few ideas are until they are properly polished, but it's going to put Ford cars in the hands of a lot of people who never would have had them otherwise.

The chief danger, naturally, is in picking credit risks, but that's up to the dealer. Fundamentally, the plan doesn't contemplate time sales but rather withholding delivery until the purchase price is saved. Practically, however, when some likely looking saver accumulates the down payment under the Ford time purchase system, there is nothing to prevent the dealer from letting him have the car and taking his notes for the balance. If he's unable to keep up his payments the dealer is out of luck. Ford has the cash for his car and the dealer is no worse off than if one of his non-saving plan buyers had fallen down.

One of the biggest advantages of the plan is that it will keep retail salesmen on their toes. Most dealers have agreed to advance a part of the salesman's commission on each savings club contract he brings in. They probably will operate on a sliding scale—the more contracts the bigger the advance commission. There will be an incentive for the salesman to keep on the job all the time and if he's a regular salesman he ought to get a few contracts every day.

Motor car dealers in general would sob from joy if their factories would give them some practical means of keeping their salesmen happy and always working. Some of them already have adapted the Ford savings plan to their own needs.

So long as motor vehicles must be sold on time anyway, whatever the factories can do to increase the number of prospects available for their dealers the better off they will be, provided the hazards of the dealer aren't increased and they aren't under the Ford plan. He is under no obligations to deliver a car until the entire purchase price is saved.

This is practically an unexplored field in retail automobile financing and the pioneers are the ones who will profit most from its exploration.

J. D.

Coordination Plans Step Forward

U. S. Chamber Talks Transport Problems

Industry Generally Is Acquainted
with Moves Needed to
Accomplish Aims

NEW YORK, May 8—Coordination of transportation in all its phases as advocated by the Government, leaders in the railroad field and the automotive industry has been the central theme of the annual convention of the United States Chamber of Commerce in session here this week. Broad consideration has been given the subject from the viewpoints of those interested in railways, highways and waterways.

As a consequence distinct progress has been made in familiarizing industry generally with the problems involved and the complicated steps necessary before anything really noteworthy can be accomplished.

As a consequence only progress reports have been possible by the special committees appointed to survey the entire field of transportation. The subcommittee on the relation of highways and motor transport to other transportation agencies is headed by Alfred H. Swayne, vice-president of the General Motors Corp. One of the most important phases of the work of this committee is a study of the developments in the handling of freight through terminals by the store door delivery systems in use in Canada and England.

Taxation Study Undertaken

A study of taxation and of the regulation of common carriers also has been undertaken. Preliminary studies indicate that there is a broad field for the supplemental use of motor buses by electric railroads.

"A more scientific use of all road vehicles," said Swayne's report, "would not only reduce railway terminal congestion, but, due to the higher load efficiency obtained, would also permit us to make one vehicle do the work now requiring three or more."

One of the features of the convention was the address of Roy D. Chapin before a general session of the convention, on "Cooperation Between Motor and Railroad." He sketched the spectacular growth of the motor vehicle and its revolutionary effect upon society, pointing out that no form of transportation can survive unless it performs the service demanded by the public. This will constitute the true test and will determine

Business in Brief

NEW YORK, May 10—Probably the outstanding development in the industrial situation has been the halt in the upswing of general prices and notable recessions made by commodity prices. It is obvious that the peak has been reached for many of the basic commodities.

In a comparatively short period the situation has changed from one of buyers rushing to secure deliveries of goods with a concomitant climbing of prices to that of moderation and orderly buying. The unique part about this rapid change of affairs is that it appears to have been brought about without outside pressure.

In spite of moderation in purchasing of iron and steel there is every indication that orders will keep plants at high levels of production. Operations are now approximately 90 per cent of capacity. The paying of premiums for prompt deliveries has entirely disappeared. Railroad buying is very heavy still and building operations do not show any serious cessation.

Wage increases continue, bringing with them the problem of rising costs as a threat to profits. The problem discussed is one of reducing production costs to equalize the difference. Undoubtedly there will be much agitation on the part of employers and employees as the situation grows more serious.

Car loadings for the week ending April 21 aggregated 957,743 cars, which was an increase of approximately 10,000 cars over the week previous. There has been no indication of smaller car loadings as yet.

which shall be most widely used. He pointed out, however, that the automotive industry never had contended that the motor truck should be used for anything except short haul, less than carload lot service.

Charles H. Markham, president of the Illinois Central, was the chief spokesman for the railroads. He conceded that there was a wide field for the use of the motor truck for freight handling in congested terminal areas, but he bewailed the "subsidies" which are being given motor vehicle common carriers in the

(Continued on page 1054)

Great Lakes Doubles Shipping Facilities

There Is Enough Automotive
Business, Moreover, to War-
rant Additional Boats

DETROIT, May 4.—Addition of nine vessels to the fleet of carriers exclusively engaged in automobile transportation to Great Lakes ports will give the industry practically doubled facilities for shipping by water route during the present year. Though the navigation season is not yet opened except to Toledo and Cleveland, active preparations are under way to open all routes within a short time and May 15 will probably witness a complete resumption of lake shipping.

Increased facilities for the automotive industry are offered by four lines, two of which are new this year. These latter are the Universal Steamship Co., an offshoot of the Universal Carloading & Distributing Co., which will operate four boats between Detroit, Chicago and Milwaukee, and the Crosby Transportation Corp., which will run one boat between Milwaukee and Detroit only. Former companies making additions to their fleet are the Nicholson Transit Co., which is adding two boats, and Tri-State Steamship Co., also two boats, the latter two companies operating to Chicago and Milwaukee and also to Cleveland.

Service Further Augmented

All of the above lines carry automobiles only and some packet freight, but none are passenger carriers. In addition there are the big combination freight and passenger boats of the Detroit & Cleveland Navigation Co. and Detroit and Buffalo Steamboat Co., which will offer the same facilities as a year ago, augmented during the present year by the addition of several new boats now under construction.

Despite the extensive additions to the fleet, factory traffic managers declare that these will offer only a measure of relief and that there is business enough for many more vessels if docking facilities were available. Shortage of docks at which boats may load is declared the limiting factor in the steamship business in Detroit. If it were not for this factor there would be many more steamship companies in operation and there would be plenty of business for all from the automobile factories alone, without considering the other industries of the city.

With a continuance of the present heavy manufacturing, the opening of

(Continued on page 1054)

Noteholders Acquire Republic Truck Plant

New Company Formed, Headed by Bank President, to Continue Operations

DETROIT, May 7—The sale of the Republic Motor Truck Co. to the noteholders committee which bid \$1,200,000 for the property in its entirety at the sale Thursday, has been confirmed in the Federal Court. Plans were perfected previous to the confirmation for the formation of a new corporation to proceed with the manufacture of trucks without interruption, the new company to be headed by M. M. Buckner, president of the Bankers Trust Co. of New York, with capital to be furnished by New York and Chicago bankers.

Another Bid Entered

A determined effort to acquire the property was made by the Republic Assets Corp., representing the preferred creditors committee, which bid \$1,161,000 for the property in parcels. This latter group was headed by the Torbensen interests in Cleveland, which were declared prepared to take over the manufacture of the truck line. The Republic Motor Truck Corp. holds the shop rights for the Torbensen axle.

A bid of \$500,000 for parcel "C," which comprised the Republic Truck Sales Corp., offered by the stockholders committee, throws the whole matter back in court if the stockholders can take up this bid in ten days. The sale was confirmed to the noteholders committee with this proviso.

The next best bid for the parcel was one of \$10,000 by the preferred creditors committee. The parcel was appraised at \$1,000. The court's view of the bid was that it was made rather as an obstructive move and as a last minute effort to force recognition of the stockholders' interest.

Misunderstandings Settled

The confirmation hearing extended over four hours, at which counsel for the various interests undertook to smooth out the difficulties. It developed that the creditors committee understood the noteholders' bid to have been based on payments over a year. The creditors' bid would have been higher under similar conditions, it was asserted. The question arose as to which of the two bids was the better under the circumstances, and whether the two sides should not be permitted to increase their bids by bonuses in the interest of the estate.

The court's ruling was that the master conducting the sale should determine the first question, and then that this

Long Time Commitments, Extending Over Period of Six Months to Year, Should be Avoided

By ROY M. HOOD,

General Purchasing Agent of the Rickenbacker Motor Co.

Detroit, May 7.

THE material supply situation in the third quarter of the year will not change much from present conditions. Deliveries are now in good shape and the only changes in price will be of a generally stabilizing nature. Commitments extending three or four months are, in my opinion, entirely safe, but beyond that period, there is no reason for speculating. When we speak of long time commitments today we do not mean the three or four months' commitments. Commitments running six months to a year such as were the rule in 1919 to 1920 are to be avoided.

Steel production is running along on an even basis and buyers are getting deliveries as required. The early months of the year caught the industry unprepared and it was necessary to pyramid on first orders placed. This condition has been removed with better estimates on production requirements and there is a much steadier tone to the market now.

Advances in wages in the steel districts will of necessity keep prices on a somewhat higher level than before. Shortages of labor in some fields related to the automobile industry has resulted in wage rates in excess of the value of the work performed and this condition will have to be remedied.

Indications are that closed bodies will be more in demand than ever in the fall and that there will be some difficulty in obtaining these in the number required. In the better class cars today demand is running about 65 per cent closed. In our case the demand runs as high as 85 per cent and we would like it to be 100 per cent if possible.

The plate glass shortage has had serious effect in holding back closed body making but this is being remedied to a large extent by the importation of glass from abroad. Holland is sending in large supplies of glass and this source of supply should make up shortages existing to this time. There also is considerable skilled labor shortage in the closed body field.

For the balance of the year the outlook for business is very good and aside from a slowing down in July sales should continue at a steady pace. We look for August to start off a good fall business which in all likelihood will continue through to the latter months of the year.

Though the industry is approaching the point where manufacturing will be distributed throughout the year, it is still subject largely to seasonal influences. Each spring there is a shortage of cars and a general crowding together of orders which might be overcome if buying were more spread out. This year the industry was surprised by the unusually early rush and was unprepared. There was no precedent for the early buying and it cost companies money to be caught unprepared. This situation has now, however, straightened itself out and everything is running smoothly.

bidder should have opportunity to offer a bonus before the court confirmed the master's acceptance. The confirmation, however, was made without bonus payment.

At one point in the hearing there developed the possibility of all bids being rejected and a new sale held in five to six weeks. This delay, however, would be detrimental to the interests of all, it was declared, and it was argued that it was highly important for the property to be disposed of at once, in order that it might have the opportunity of operating with the truck market in the present favorable condition.

Stockholders Approve American Body Plans

PHILADELPHIA, May 5—Stockholders of the Hale & Kilburn Corp. have approved the reorganization plan for the American Motor Body Co., under which Charles M. Schwab, chairman of the Bethlehem Steel Corp., will become executive head of the Motor Body Corp., which will be the successor to American Body.

Detroit Service Meeting to Be Opened by Koether

NEW YORK, May 7—A change has been made in the program of the convention of factory service managers, to be held in Detroit, May 15 and 16. C. F. Kettering will be unable to attend, and the opening address will be made by B. G. Koether, in charge of sales, service and advertising of the advisory staff of the General Motors Corp.

Other speakers will include J. H. Newmark, manager of the sales promotion department of Durant Motors, Inc.; L. V. Pulsifer, vice-president of Valentine & Co.; Richard Hardst, general manager of the Cadillac Detroit branch, and T. W. Holloway, assistant technical manager of the Cadillac Motor Car Co.

GERMAN GRAND PRIX OFF

BERLIN, April 19 (by mail)—The German Grand Prix, scheduled for May 10, will not take place because the French have taken possession of the factories of Benz and Opel, preventing the completion of those cars. The race may be held in the fall.

McDuffee Will Head New Elgin Company

Organization Is Under Way by
Purchasers of Some Tangible Assets

CHICAGO, May 5—Continuation of the manufacture of the Elgin automobile is proposed by a group of men who have purchased certain assets of the old Elgin Motor Car Corp. at Argo, Ill., and are engaged in the organization of a new company.

At the head of the company as president and general manager is J. H. McDuffee, formerly connected in an executive capacity with Willys Overland, Inc., and with the Cole Motor Car Co. of Indianapolis. Associated with him is B. E. Lynam, chairman of a committee of stockholders of the old company.

The company is to be known as Elgin Motors, Inc. Details of incorporation and capitalization have not yet been determined. The location of the factory also is uncertain. Three cities are said to be under consideration, and according to present plans the location will be in either Michigan or Indiana.

Old Plant Not to Be Used

The plant of the old Elgin company will not be utilized by the new company under any circumstances, according to McDuffee. This plant is being offered for sale by the receiver who has been in charge. Neither will any of the machinery in the old factory be used in the new, the cost of moving it being considered too great, according to the organizers.

Assets of the old company purchased by the organizers of the new company include name, good-will, patterns, blue prints and other data prepared for the production of the latest model Elgin cars. The engineering data will be revised somewhat to keep progress with engineering developments, but on the whole the new Elgin car will be the model that the old company was preparing to place in production when the receivership halted it. It will be priced in the neighborhood of \$1,500.

Bought Assets for \$3,500

Assets of the old Elgin corporation sold by the receiver, comprising tangible property, brought about \$75,000 at auction. The price paid by the organizers of the new company for the assets bought by it was about \$3,500. Buildings and real estate are still in the hands of the receiver, who is endeavoring to sell them at private sale. The total appraisal of the property was \$434,194. Secured claims against the corporation are \$150,000 and unsecured claims are approximately \$800,000.

The new company will be free of any liabilities or obligations of the old corporation and the management will be entirely new, according to the organizers. It is announced that C. S. Rie-

PARTS MAKERS HEED LESSON 1920 TAUGHT

NEW YORK, May 7—"A confidential survey among our own members indicates that parts and accessory manufacturers have learned the lesson of 1920; that is to say, they are not being swept off their feet by the exceptionally good business now current," says a bulletin issued by the Motor and Accessory Manufacturers Association to its members.

"Instead of permitting orders to pyramid dangerously, they are more inclined to buy from hand to mouth and to insist on bona fide orders with definite shipping dates. Most members report they have such bona fide orders on hand for May and June and therefore are about sixty days ahead on their own purchases, to keep abreast of commitments of their customers.

"In most cases tentative schedules are furnished thirty days ahead of actual shipping dates. Inventories are reported to be in excellent shape as compared with excessive stocks in 1920."

man, organizer and former president of the Elgin Motor Car Corp., has withdrawn all connection with the committee of stockholders which is taking the lead in forming the new company.

New Company Will Make Bus and Rail Car Bodies

LIMA, OHIO, May 7—The Superior Motor Coach Body Co. has been organized for the exclusive manufacture of motor coach bodies and has taken over a newly completed modern factory in this city. The company believes it has a large field among truck manufacturers who are after bus and rail car business.

Officers are: President, Emmett R. Curtin, Sr., president of the Lima Natural Gas Co.; vice-president, R. J. Plate, vice-president of the Diesel-Wemmer Co.; secretary and treasurer, Howard P. Dean, vice-president of the Lima Trust Co.

Other principal stockholders are: John E. Calvin, president of the Ohio Steel Foundry Co.; J. F. Neubauer, former president of the Solar Refining Co.; H. L. Breckenridge, vice-president of the Lima Locomotive Works, and W. L. Parmeter, attorney.

DUNLOP SALES STARTED

BUFFALO, May 7—The commercial opening in America of the Dunlop Tire & Rubber Corp. of America started today in a retail way. The company is beginning slowly and will not attempt a national campaign at the outset. It will go after retail business in the East first, radiating out of Buffalo, Boston and Philadelphia.

Receiver in Charge of Kalamazoo Truck

John L. Carey, General Manager,
Appointed—Bank Made
Application

KALAMAZOO, MICH., May 5—Judge George V. Weimer of the Circuit Court has appointed John L. Carey as temporary receiver for the Kalamazoo Motors Corp., builder of the Kalamazoo truck, upon application of C. Hubbard Kleinstuck, representing the First National Bank, trustee under a bond issue.

Kleinstuck asked for the appointment in the foreclosure of a mortgage on the company's real estate which secured an outstanding bond issue of \$104,000 of an authorized \$250,000.

Carey has been acting as general manager of the company in the place of H. A. Crawford, who was forced to take a rest after his efforts to keep the company operating.

Kalamazoo Motors was organized in 1919 with an authorized capital of \$1,000,000 of which \$150,000 was actually paid in. The business and property of the Lane Truck Co. was purchased.

The incorporators included some of Kalamazoo's strongest men financially, and the concern started with bright prospects. Crawford, who was formerly head of the Lull Company, was elected president and general manager of the new concern. As difficulties arose he endeavored to reorganize the concern. Conditions were aggravated by the business slump that followed the war.

Bankruptcy Petitioned by Kalamazoo Sedan Co.

KALAMAZOO, MICH., May 5—The Kalamazoo Sedan Co., manufacturer of sedan tops, has entered a voluntary plea in bankruptcy in the Circuit Court here, coupled with the request that the company's affairs be wound up and the corporation dissolved. The petitioners were represented by John W. Adams and S. H. Van Horn. Judge George V. Weimer appointed Ben Dunkley as temporary receiver. Dunkley has already filed his bond.

The company was organized in 1921 with a capital of \$150,000, less than half of which was actually paid in. It purchased the Kalamazoo Carriage Co.'s factory. C. C. Bobb served as its first president and was succeeded by Sanford A. Wiltsey.

The company was confronted with financial troubles early in its existence and is said to have failed in its efforts to establish satisfactory trade relations for its product.

"If we are able to sell the real estate to advantage, we shall be able to satisfy the creditors," Adams said. "At the very best there will be practically nothing left for the stockholders after the debts are paid."

\$42,621,724 Reported as Durant Earnings

Financial Statement Covers Fifteen Months of Actual Operation by Company

NEW YORK, May 7—According to a financial report issued by W. C. Durant, president of Durant Motors, Inc., the corporation had made \$42,621,724 at the time the balance sheet was made up, Dec. 31, 1922. This is the result of fifteen months' actual operation, for although the company was organized in January, 1921, it was not in active operation until Oct. 1 of that year.

This profit total is made up of \$5,831,652 net income; \$354,566 premiums received from the sale of capital stock, less selling expense; \$12,947,505, stocks in affiliated corporations in excess of cost, and \$23,488,000 in participating contracts.

Of the total of \$85,659,765 in assets the quick assets are \$579,584 in cash on hand and in banks; \$11,153,209 in notes receivable and secured; \$779,299 in sight drafts and \$4,480,848 in accounts receivable. In the liabilities column are noted \$3,378,438 in current accounts payable; \$1,029,878 in taxes, payrolls and sundries, not due; and \$4,742,514 due on properties purchased.

14 Per Cent Made on Net Sales

While the cash on hand and in bank is comparatively low, the surplus is larger and the income account total shows the corporation made about 14 per cent on its net sales.

The consolidated balance sheet of the corporation is as follows:

ASSETS	
Real Estate, Plant and Equipment, less depreciation	\$13,366,625
Participating Contracts	23,488,000
Investments in Other Companies	19,118,858
*Listed Securities at Cost	3,680,560
Cash on Hand and in Banks	579,584
Notes Receivable-secured	11,153,209
Sight Draft B/L Attached	779,299
Accounts Receivable	4,480,848
Prepaid Expenses	506,819
Materials and Supplies	8,505,959
	\$85,659,765
LIABILITIES	
Accounts Payable—current	\$ 3,378,438
Taxes, Payrolls and Sundries—not due	1,029,878
Due on Properties Purchased	4,742,514
Purchase Money Mortgages	3,394,249
Capital Stock Issued or Subscribed	30,492,959
Surplus	42,621,724
	\$85,659,765
*Market value of listed securities	\$4,848,601.98.
INCOME ACCOUNT	
Net Sales	\$39,296,381
Cost of Net Sales	33,767,560
Gross Profit	\$ 5,528,820
Miscellaneous Net Additions	2,436,238
Total Income	\$ 7,965,059
Less Administration and Selling Expense	2,133,407
Net Income after Provision for Federal Taxes	\$ 5,831,652

CARS IN SQUARE MILE GREATEST IN DAYTON

NEW YORK, May 7—Statistics compiled by the National Automobile Chamber of Commerce shows that Dayton, Ohio has 1885 motor vehicles per square mile, which puts this city at the top of the list of such rating.

Detroit comes next, with 1867, and San Francisco third with 1803 cars and trucks to the square mile.

SURPLUS ACCOUNT	
Net Income as per Income account	\$ 5,831,652
Premium Received from Sales of Capital Stock, less Selling Expense	354,566
Stocks in Affiliated Corporations in Excess of Cost	12,947,505
Participating Contracts	23,488,000
Total Surplus as per Balance Sheet	\$42,621,724

Durant in his report tells of the arrangement with Star Motors, Inc., which is a participating contract, the terms of which call for Durant Motors, Inc. manufacturing Star cars for a term of twenty years, receiving in lieu of a fixed manufacturing profit a percentage of profits resulting from distribution. This contract is valued at \$20,988,000.

The contract with the Hayes-Hunt Corp., valued at \$2,500,000, gives to Durant Motors, Inc., a percentage of the profits as earned payable in stock. Durant only agrees to purchase certain types of closed bodies.

It also is announced that the Motor Parts Corp. is made up of a consolidation of the New Process Gear Co. of Syracuse, N. Y., the Adams Axle Co. of Findlay, Ohio, and the Warner Corp. of Muncie, Ind., Durant Motors, Inc., owning the entire capital stock. This concern manufactures differential gears, axles, steering gears and transmissions.

Owns Glass Plant

The entire capital stock in the American Plate Glass Co. of Kane, Pa., acquired several months ago, is owned by Durant Motors, Inc. The plant has a capacity of 5,000,000 sq. ft. of plate glass yearly.

Of the other plants, Durant Motors, Inc., owns all the stock of the Durant Motor Co. of New Jersey, which holds the old Willys Corp. plant at Elizabeth, with a capacity of 600 cars a day. Durant Motors, Inc., supervises and manages the Durant Motor Co. of Michigan, whose plant at Lansing, Mich., has a capacity of 500 cars a day, receiving for this 60 per cent of the net profit.

The Durant Motor Co. of California, located at Oakland, also is supervised and managed by Durant Motors, Inc., which collects 60 per cent of the net profits. This plant has a capacity of 200 cars a day. Durant Motors of Canada, Limited, also is under direct control of Durant Motors, Inc., which receives a percentage of the net profits.

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Ford Report Shows \$690 Share Profit

On February 28, End of Fiscal Year, Cash Holdings Were \$159,605,887

NEW YORK, May 7—In a statement filed with the Massachusetts Commissioner of Corporations at Boston for the year ended Feb. 28, 1923, the Ford Motor Co. reports profits of approximately \$119,000,000 after paying all running expenses and making allowance for depreciation, depletion, taxes and other charges which might be deducted from current earnings. This is equal to about \$690 a share on the outstanding capital stock of \$17,264,500, consisting of 172,645 shares of \$100 par value each.

On Feb. 28 the company had total cash holdings of \$159,605,887, the largest at any time in the history of the company.

The statement shows that the inventory account was carried on the general balance sheet at \$83,693,884, a total almost double that of the same date last year, and with the exception of 1920, which was \$96,000,000, the largest ever carried. Liquidating of inventory since Feb. 28 is believed to have greatly increased the cash account.

Company's Financial Statement

The complete financial statement of the company, as filed in Boston, follows, the figures being as of February 28:

ASSETS		
	1923	1922
Real estate	\$86,047,010	\$81,026,633
Machinery and equip.	54,753,388	49,401,132
Mer. mat. stk. in process	83,693,884	45,208,094
Notes	74,833	6,899
Cash	159,605,687	109,232,732
Accounts rec.	41,938,329	39,375,702
Patent rights	155,896	110,740
Securities	37,401,695	15,749,953
Furniture, fixtures	51,094,765	39,221,861
Misc. investments	548,700	500,814
Good-will	20,517,986	20,517,986
Deferred charges	529,766	196,399
	\$536,351,939	\$400,548,946
LIABILITIES		
	1923	1922
Capital stock	\$17,264,500	\$17,264,500
Accounts payable	61,488,980	33,089,894
Notes payable		
Insurance		
Depreciation and amortization reserve	62,576,256	50,829,307
Deferred credit	388,598	853,950
Reserved for Federal and local taxes	34,856,007	58,032,559
Profit and loss surplus	350,777,598	240,478,736

The increase in profit and loss surplus in a year amounted to \$119,298,862.

G. M. STOCKHOLDERS 66,826

NEW YORK, May 7—The number of General Motors stockholders of record during the second quarter of 1923 was 66,826, as compared with 67,125 of the preceding quarter. Holders of common stock number 45,330.

Liberty Plant Sale May Be Held June 15

Present Order of Sale Called Off
After Series of Postponements
Starting April 3

DETROIT, May 8—The sale of the Liberty Motor Car Co., under the present order of sale was called off by the receiver today after a series of postponements dating from April 3. An amended order of sale will be issued by the court as soon as attorneys for the receiver and for the creditors have arranged the terms. A new sale will probably be advertised for some time about June 15.

No bids were offered for the plant under the present upset price which was fixed at \$1,175,000. The deposit of Henry B. Joy, former president of Packard, was withdrawn following three weeks of delay in which it was understood he was seeking a reorganization with present officers remaining in control. No other persons qualified to bid. The receiver was unable to say today whether the present upset price would be modified.

It has been reported that the persons most interested in the reorganization of the company have failed to bid on the property under the former order of sale because the upset price was regarded as too high.

Isotta-Fraschini Shows Loss in 1923 Operations

PARIS, April 25 (*by mail*)—The last year's operations of the Isotta-Fraschini Automobile Co. of Milan shows a loss of 1,800,000 liras. The preceding year was equally unsatisfactory and the capital had to be reduced from 18,000,000 to 3,600,000 liras. In order to cover the loss it is proposed to reduce the capital to 1,800,000 liras and then carry it up to 12,600,000 liras by fresh capital.

The Ansaldo San Giorgio Co. of Turin has turned off its workers, some two or three hundred, and has closed down completely. The factory is expected to open after reorganization. The Ansaldo San Giorgio, which formerly employed 8000 hands, specializes in Diesel engines for land and marine service.

For the year 1922 the net profits of the Italian Pirelli Rubber Co. of Milan, which is the largest tire company in that country, amounted to 10,600,000 lira. A dividend of 40 liras per share has been paid. The Belgian branch of the Pirelli Tire Co. showed a profit of 1,470,000 Belgian francs for the year and paid a dividend of 50 francs per share.

DURANT BUYS IN CHICAGO

CHICAGO, May 5—Two leaders in the automotive industry figured in a real estate deal here this week, the consummation of which explained some rumors that had been floating around. W. C.

FORD'S PLANS AIDED BY WATER POWER LAW

LANSING, MICH., May 7—The signing of the Hayes water power bill by the Governor, permitting private corporations to condemn 25 per cent of the land necessary to develop water power sites, may lead to the development of water power sites in the State by Henry Ford.

The Ford interests are anxious to erect a \$5,000,000 woolen mill at Ypsilanti, where Ford owns all but 2 per cent of a large water power site.

Durant purchased from J. J. Cole the southeast corner of Thirty-fourth Street and Michigan Avenue.

The site was formerly occupied by a church from which Cole bought it about two years ago. Durant proposes to erect a modern sales and service building to take care of the Chicago business of Locomobile and Flint cars.

Cleveland Builds Coupé for Professional Use

CLEVELAND, May 7—A new coupé designed especially for professional use and listed at \$1,195 is announced by the Cleveland Automobile Co.

It is mounted on the standard chassis and has a long, low appearance. The finish is in Cleveland blue with black fenders and running gear. The seating arrangement provides room for three passengers. The upholstery is in straight grain semi-bright blue leather. The seat is pitched at an angle for comfort.

Parcel carrying accommodations are provided for small articles behind the driver's seat and for larger packages, samples, etc., in the rear deck. Both spaces are protected by locks.

Moon Starts Turning Out New Model Sport Phaeton

ST. LOUIS, May 5—The Moon Motor Car Co. has started production on a new model 6-58 sport phaeton to sell for \$1,995. Full sport equipment is provided, and the lines of the car are long and low.

It carries seven passengers and is finished in milori green or maroon with a black or khaki top, silvered radiator and nicked trimmings. The upholstery is in Spanish leather, French plaited. There are six Distel wheels, the two spares being carried forward, one on each side.

D. J. ROWLAND DIES

CLEVELAND, May 7—D. J. Rowland, district representative of the Packard Electric Co., is dead. Mr. Rowland was well known among automotive manufacturers and jobbers of Ohio, western Indiana and eastern Pennsylvania.

Hercules Plant Sold to United Alloy Head

Company Will Be Organized to
Carry on Manufacture
of Engines

CANTON, OHIO, May 7—Court proceedings in connection with the sale of the Hercules Motor Manufacturing Co., this city, came to a close in Cleveland when Federal Judge Westenhaver signed an order directing Charles Balough, as receiver, to accept the proposition of E. A. Langenbach, president of the United Alloy Steel Corp., for the purchase of the company's plant and such assets as are in the receiver's hand.

Langenbach offered \$384,000, which is the appraised value of the plant and assets. In addition, the offer filed in court showed that certain obligations in the way of receiver's certificates and bills for current supplies are assumed by the purchaser.

The receiver was appointed several months ago on the application of John M. Blake as attorney for certain creditors, and since then the company has been operated under court order.

It is understood that Langenbach plans the organization of a company to continue the manufacture of engines in which the Hercules company has been engaged.

The daily capacity of the plant is now forty engines.

Foundry of Moline Plow, Valued at \$600,000, Sold

MOLINE, ILL., May 5.—H. C. Smith, former president of the Danville Foundry Co., heads a group of Chicago and Danville capitalists who have purchased the Moline Plow Co. foundry in East Moline, and will resume operations within three months. The fully equipped plant is valued at \$600,000 and will employ 350 men.

The foundry was opened in 1920 and has a capacity of 1,000 tons of castings monthly. The plant was built as part of an expansion program launched by Moline Plow.

Associated with Smith in the new company will be O. J. Failing, former manager of the National Malleable Co., Chicago; Frank Mancan, at one time foundry superintendent of the National, and E. M. Richardson, also a former official.

MORE PACKARD COMMON HOLDERS

DETROIT, May 7—Packard Motor Car Co. reports 2912 individual holders of common stock at present, as compared with 1139 a year ago. Preferred stockholders show little change and total 3600. Common shares are held largely in Detroit and points nearby, but the number of stockholders in New York and New England States is increasing.

Demand Warranting Greater Production

Caution and Labor Shortage,
However, Are Combining
to Limit Output

NEW YORK, May 7—Operations in automobile-producing plants continue to be maintained on a high level, with indications that May, with a greater number of working days, will exceed the total of 364,000 cars and trucks produced last month.

Conditions in the retail field are such as to warrant higher schedules than those followed in April, but caution against over-expansion coupled with the need for both skilled and unskilled labor will keep major producing plants operating with little increase in programs. Major producers are well booked with orders which they are unable to take care of for immediate delivery because of limited plant capacity and labor scarcity.

Steady Output Forecast

Strong demand, with consequent high output schedules, probably will continue through June at least, and while there may be a falling off after that, there is nothing now to indicate that it will be of any great magnitude. To the contrary, it is expected that operations will reach a certain, steady level along which they will go the rest of the year. It is not to be expected that such an unprecedented production mark as was reached in April will continue to mark factory operations.

There is very little variation in reports received from distributing centers throughout the country of sustained buying interest. In some sections, weather conditions have retarded business to an extent, but such trade as has been held back on that account will appear this month.

Farm Districts Big Factor

Agricultural districts are becoming greater factors in the sale of automotive products, and will become more important as the season advances. Trucks are moving in greater volume to those sections, and with the increased demand, manufacturers have moved up their schedules. Recovery in this branch of the industry has been slower than in the car-producing field, due to the dependence upon general business conditions and the necessity of regulating output by industrial improvement. The swing back to its old position, however, is now well defined, and the expansion that

GASOLINE PRODUCTION REACHES HIGH POINT

WASHINGTON, May 7—Refinery statistics for March show that the daily average of gasoline production amounted to 20,345,205 gal., which establishes a new high record.

Stocks on hand March 31 were 1,259,209,171 gal., in increase of 129,000,000 gal. over the stocks at the end of February.

The domestic consumption during March is estimated at about 440,000,000 gal., based upon the expectation of normal imports and exports.

has already set in should continue as long as general business activity is good.

Reports of parts makers show that branch of the industry to be in excellent condition. March business was well ahead of the previous month, and collections were even better than heretofore. Plants, as a rule, are operating at capacity, with the likelihood of maintaining maximum operations to the first of July. Limited plant facilities, together with difficulty in obtaining a sufficient supply of labor, continue to limit output below the demand, this being particularly true of the production of truck units.

French Will Make Gears Under Anderson Process

PARIS, April 26 (by mail)—With a capital of 4,500,000 francs, which may be increased to 8,000,000, a company has been formed here under the title, "Continental European Anderson Gear Co." to produce and market cold rolled gears under the Anderson process.

The European rights for these gears are held by the Doriot, Flandrin & Parent Automobile Co., which holds 2,500,000 francs stock in the gear company. The registered offices of this concern are 33 Boulevard Haussmann, Paris.

Truck Engineering Co. to Move to Fort Wayne

FORT WAYNE, IND., May 8—The Truck Engineering Co. will soon move from Cleveland to this city, according to an announcement by Albert H. Schaaf, general manager of the Greater Fort Wayne Development Corp.

The company has purchased two acres centering about the new plant of the International Harvester Co., on which a modern factory building will be started at once.

Truck Engineering manufactures equipment for trucks, such as hand power hoists, steel and wooden dump bodies, power winches, truck tanks, etc.

Tire Casing Output Shows Further Gain

Increase During March Is Also
Reported for Tubes and
Solid Tires

NEW YORK, May 8—Further increases in production and shipments of pneumatic casings, inner tubes and solid tires for the month of March are shown in the compilation of figures by the Rubber Association of America for the Bureau of Foreign and Domestic Commerce.

Inventory of casings and inner tubes increased over the previous month, but there was a decline in the merchandise stock of solid tires.

A comparative table of inventory, production and shipments as reported by the association is as follows:

PNEUMATIC CASINGS				
	No. Mfrs.	Inven- tory	Produc- tion	Ship- ments
1922—	Reporting			
Jan.	66	4,174,216	2,055,134	1,596,806
Feb.	66	4,691,329	2,084,308	1,562,365
Mar.	63	5,183,286	2,645,790	2,073,963
April	65	5,464,336	2,401,187	2,086,651
May	65	5,523,095	2,721,503	2,639,273
June	64	5,042,147	2,838,890	3,133,260
July	63	4,834,106	2,476,636	2,695,095
Aug.	63	4,629,392	2,905,209	3,029,823
Sept.	64	4,612,037	2,504,744	2,502,106
Oct.	64	4,682,958	2,674,662	2,588,770
Nov.	62	4,964,976	2,733,134	2,379,708
Dec.	59	4,599,208	2,656,942	2,934,079
1923—				
Jan.	62	4,695,916	3,127,270	2,994,297
Feb.	60	5,224,387	3,217,987	2,588,639
Mar.	58	5,670,601	3,865,726	3,322,637

INNER TUBES				
	No. Mfrs.	Inven- tory	Produc- tion	Ship- ments
1922—	Reporting			
Jan.	66	5,246,647	2,343,393	1,889,724
Feb.	65	6,141,956	2,596,774	1,702,583
Mar.	63	6,991,118	3,017,511	2,090,737
April	65	7,230,096	2,650,573	2,329,343
May	65	7,189,552	2,970,696	2,938,947
June	64	6,186,534	3,130,629	3,973,679
July	63	5,675,839	3,068,199	3,630,744
Aug.	63	5,207,228	3,808,224	4,220,055
Sept.	64	5,164,757	3,501,442	3,558,971
Oct.	64	5,488,033	3,787,758	3,420,680
Nov.	61	6,210,053	3,856,908	3,075,023
Dec.	59	5,732,125	3,411,074	3,825,949
1923—				
Jan.	62	5,838,310	3,951,885	3,748,651
Feb.	60	6,771,958	4,039,202	3,901,697
Mar.	57	7,740,945	4,875,414	3,828,315

SOLID TIRES				
	No. Mfrs.	Inven- tory	Produc- tion	Ship- ments
1922—	Reporting			
Jan.	11	181,769	40,224	33,294
Feb.	11	183,448	39,492	36,805
Mar.	11	182,197	49,433	48,350
April	11	173,748	46,664	52,309
May	11	170,904	57,640	60,711
June	11	169,808	66,089	63,408
July	11	176,375	71,505	60,425
Aug.	11	189,698	84,313	69,435
Sept.	11	200,016	82,767	66,797
Oct.	11	213,942	85,480	71,275
Nov.	11	234,684	85,775	61,466
Dec.	10	244,061	77,221	64,570
1923—				
Jan.	11	262,462	83,343	60,611
Feb.	11	270,191	75,457	63,394
Mar.	11	265,843	79,788	77,144

Explanatory Notes

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" include only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

35 Cars, 10 Foreign, Will Race on May 30

Entries for Eleventh Annual 500-Mile Sweepstakes at Indianapolis Closed

Indianapolis Entries

CARS AND DRIVERS

Packard Special, Ralph DePalma
Packard Special, Joe Boyer
Packard Special, Dario Resta
Mercedes Special (German), Christian Lautenschlager
Mercedes Special (German), Max Sailer
Mercedes Special (German), Christian Werner
Durant Special, Harry Hartz
Durant Special, Cliff Durant
Scheel-Frontenac, Dave Lewis
Durant Special, Jimmy Murphy
Durant Special, Eddie Hearne
Miller Special, Tommy Milton
Schmidt Special (French), Jules Goux
Bugatti (French), Pierre de Vizcaya
Bugatti (French), Prince de Cystria
Bugatti (French), Raoul Reganti
Bugatti (French), M. de Alsaga
Rolland-Pilain (French), Albert Guyot
Duesenberg Special, (Not Named)
Duesenberg Special, (Not Named)
Miller Special, Bennett Hill
Scheel-Frontenac, Herbert Scheel
Scheel-Frontenac, Ira Vail
Scheel-Frontenac, C. W. Van Ranst
Miller Special, (Not Named)
Durant Special, Harlan Fengler
Barber-Warnock Special, (Not Named)
Durant Special, Earl Cooper
Special, Frank Elliott
FHW Special, F. H. Wells
Duesenberg Special, Jerry Wonderlich
Durant Special, Leon Duray
Clements Special, (Not Named)
Bugatti (French), Count Zborowski
Spark Plug, Mystery Driver

INDIANAPOLIS, May 7—Entries for the eleventh annual 500-mile sweepstakes, which will be run on the speedway here May 30, have closed, with thirty-five cars nominated, ten of them of foreign make.

The sweepstakes marks the return to racing of the Packard Motor Car Co., which has entered a team of three cars to be under the direct supervision of Jesse G. Vincent, vice-president of engineering, and driven by De Palma, Resta and Boyer.

Fred Duesenberg has nominated personally three Duesenbergs.

Cliff Durant has put in a team of seven Durant Specials which will be handled by Murphy, Hartz, Hearne, Cooper, Fengler, Leon Duray and Durant himself. Harry Miller has three Miller Specials entered. Milton and Hill will be two of the drivers.

Louis Chevrolet has declared three Scheel-Frontenacs, with Vail, Van Ranst and Scheel as drivers. The Barber-Warnock Co. of Indianapolis, has entered a Ford Special which is 75 per cent Ford and fitted with a Frontenac engine.

The foreign cars include three Mercedes, five Bugatti, a Rolland-Pilain and a Schmidt Special. Among the European pilots coming over are Lautenschlager, Sailer, Werner, Jules Goux, Pierre de Cystria, Raoul Reganti, de Alsaga and Count Zborowski.

Brings His Own Fuel

NEW YORK, May 9—Count Zborowski, a Polish nobleman whose home is at Higham, Canterbury, England, arrived yesterday on the Majestic, bringing with him not only the French Bugatti which he will drive in the Memorial Day race at Indianapolis but also 250 gallons of motor fuel.

This fuel, which is a mixture of Zborowski's, has alcohol for a base and the Count has to pay a duty of 15 cents a gallon on it. This is the first time a foreign race driver has brought his own fuel with him.

Shipments by Hupp Show Increase of 63 Per Cent

DETROIT, May 4—Hupp Motor Car Corp. shipments for April were 4637 cars and for the first four months of the year 16,671, which compares with shipments of 10,205 for the same months a year ago, an increase of 63 per cent. By the end of May the company will run considerably in excess of half of its scheduled output of 40,000 for the year.

Reports from distributors and dealers show that Hupp sales in April were the greatest they have ever enjoyed, and that cars are being sold as rapidly as the factory can deliver them. Many distributors and dealers have already sold their May allotment and are seeking increased shipments.

Fordite Plant Active in Daily Production

DETROIT, May 3—The Fordite plant of the Ford Motor Co. is now in daily production of 8500 steering wheels, 9000 front spring pads, 150,000 commutator insulator buttons, 9000 magneto contact insulators, 7500 cut-out insulators, 8000 motor starter insulators, 8000 generator insulators, 8000 dash terminal blocks, 6000 battery cable bushings, 19,000 hood block bushings, 20,000 tail light bushings, 3200 battery covers, 6500 rear panel plugs and 10,000 cable insulators for metal dashes.

Fordite is a composition developed by the Ford company in which is used all the straw annually harvested on the Ford farms at Dearborn. About 75 per cent of straw required is furnished by the farms, the remainder being bought.

MCDONALD SOON TO START

ALLIANCE, OHIO, May 7—Production is soon to be started on steam automobiles and power plants by the McDonald Steam Automotive Corp. of Garfield. The first output of the plant will be engines of the steam type to replace gasoline engines in existing cars. Kerosene is used for fuel.

Fly Across Country Without Making Stop

Two Government Aviators Travel
2700 Miles at Average of
100 m.p.h.

NEW YORK, May 7—Flying from coast to coast without a stop is an accomplished fact through the feat of Lieut. Oakley G. Kelly and Lieut. John A. Macready of the Air Service, in piloting a Government plane from Mitchel Field, New York, to Rockwell Field, San Diego, Cal., a distance of 2700 miles in 26 hours, 50 minutes and 38 2-5 seconds. A speed of 100 miles an hour was averaged.

The flight was made in the Army monoplane T2, a Fokker type fitted with a twelve-cylinder 5 x 7 420 hp. Liberty engine. The equipment consisted of an Edison battery, Delco generator, Zenith carburetor and Mosler plugs. The plane has a wing span of 74 feet, 10 inches, a total wing area of 958 sq. ft., an overall length of 49 feet, a height of 11 feet, 10 inches and a speed range of from 75 to 100 m.p.h.

Fuel Was Gasoline Mixture

It carried 735 gallons of gasoline, 35 gallons of oil and 25 gallons of water, a weight of 5000 pounds. The gasoline consisted of a mixture of 600 gallons of California gasoline, 35 gallons of benzol together with 100 gallons of 68 high test gasoline.

Reports made by the pilots show that the trip was comparatively uneventful. Starting from Mitchel Field, New York, at 12.36.18 p.m., May 2, Eastern time, the finish was made at 3.26 p.m. Eastern time, the next day at San Diego. On leaving the ground at the start, the plane almost hit a hangar and crossing the New York-New Jersey line the voltage regulator cut out. Replacement of the part was accomplished without difficulty and the flight continued without interruption.

The flyers were checked at Indianapolis at 7.50 p.m., at St. Louis, 10.15 p.m., Atchison, Kan., 12.05 a.m., Santa Rosa, N. M., 8.30 a.m., and at Wickenburg, Ariz., at 12.20 p.m.

Hold Sustained Flight Record

Kelly and Macready hold the world's record for sustained flight—36 hours, 5 minutes, 20 seconds. Macready also holds the altitude record of 34,509 feet. They also hold the previous best American non-stop record, which was 2060 miles, when they flew from San Diego to Indianapolis.

The non-stop flight across the Atlantic made by Alcock and Brown, from St. John's, Newfoundland, to Clifden, Ireland, was only 1960 miles in actual distance. The world's distance non-stop record is that of the British R-34, lighter than air craft, that flew from England to New York in 1919, covering a distance of 3200 miles.

Men of the Industry and What They Are Doing

New York Honors Galvin

Signal honor has been done John F. Galvin, president of the Metal Stamping Co. of Long Island City, maker of the Lyon bumper, through his appointment on the Port of New York Authority in place of Governor Smith, who retired following his election. There are six men on the committee, which will spend several hundred million dollars in improving the port of New York—three from New York and three from New Jersey.

Mott Detroit Trust Director

Charles S. Mott, vice-president of the General Motors Corp., has been elected a director of the Detroit Trust Co.

Coffin Back from Europe

Howard E. Coffin of the Hudson Motor Car Co. and chairman of airplane production during the war, is back from Europe, after attending the Rome conference of the International Chamber of Commerce. Coffin declares that France is far ahead of the United States in the development of commercial flying. It is possible to start from Paris in nearly any direction to almost any point in Europe and some places in Africa, he says. Paris is building immense aerodromes of concrete on its outskirts, Coffin says. The Liberty engine is well liked abroad, he states, and Fokker planes are being equipped with them.

John Younger Opens Office

John Younger, formerly vice-president of the Standard Parts Co. and later general manager of the Standard Welding Co. of Cleveland, has opened an office at 13515 Lake Shore Boulevard, Cleveland, and will handle technical publicity, particularly in the direction of preparing special articles describing technical processes for technical products.

Shepard Heads Holley Sales

E. H. Shepard has been appointed general sales manager of the Holley Carburetor Co., assuming this position May 1. For the past twelve years Shepard was connected with the Stromberg Motor Devices Co., the last five of which he served as manager of the Detroit branch. Before managing the branch, he was engaged in sales engineering work for the company.

H. E. Westmoreland Advanced

Announcement of the appointment of H. E. Westmoreland as sales manager of the McQuay-Norris Manufacturing Co. of St. Louis, Indianapolis and Connersville, Ind., was made at the regular spring conference of the seventeen branch managers of the company. For nine years Westmoreland served as southwestern manager for McQuay-

Norris, with headquarters in Dallas, Tex., having charge of the Texas and Oklahoma territories and for the last year has been in the sales department at the general offices of the company in St. Louis. Westmoreland became affiliated with the McQuay-Norris company shortly after its organization.

Miles Returns from England

Samuel A. Miles, general manager of the New York and Chicago national shows, is back from his trip to England. The trip was not as enjoyable as anticipated because of a twisted knee that developed with Miles within a few days of his arrival in England. He was unable to get about and now that he has returned he will have to remain inactive in his New York hotel for another week or ten days before the physicians will allow him to move around.

Thermoid Appoints O. H. Smith

O. H. Smith has been named supervisor of tire sales by the Thermoid Rubber Co. of Trenton, N. J., which has created a separate tire division. The company plans to increase its tire production materially and to add to its sales force to handle the increase. At various times Smith has been identified with Firestone, McLaren Rubber Co. and the Doss Rubber Co. He was prominent in the creation and organization of the National Chain Dealer Association of Atlanta.

Rehe Manages Westcott Plant

J. M. Rehe has been appointed manager in charge of factory operations of the Westcott Motor Car Co. He takes up the duties of Karl Schreiber, who has returned to the Springfield works of the International Harvester Co. as assistant superintendent. Rehe assumes the managership beside serving as secretary and treasurer of the Westcott company.

Treasurer of S. A. E. Section

Milton Tibbetts, patent counsel and assistant secretary of the Packard Motor Car Co., has become treasurer of the Detroit section of the S. A. E.

Sidney H. Hale Chosen New President of Denby

DETROIT, May 9—Sidney H. Hale, formerly general sales manager of the Vim Motor Truck Co., Philadelphia, has been named president of the Denby Motor Truck Co. and will take over the duties of his new office at once.

A. S. More, who is retiring to become president of the Selden Truck Corp., will leave the Denby company at the end of this week and will begin service with Selden Monday.

Automotive Gear Appoints Lyman

W. H. Lyman has been appointed vice-president in charge of manufacturing by the Automotive Gear Works, Inc., which moved its plant from Atlanta, Ga., to Richmond, Ind., last January. Lyman was general superintendent of the Warner Gear Co., Muncie, Ind., for nearly twelve years, previous to which he served as production manager of the American Locomotive Co. of Providence, R. I. In the bicycle days Lyman was production manager of the Overman Wheel Co. of Chicopee Falls, Mass., which also made the first Knox gasoline car. He has been active in the American Gear Manufacturers Association as a member of the General Standardization Committee.

Moohring Gray Treasurer

Lester A. Moohring has been named treasurer of the Gray Tractor Co., Inc., of Minneapolis. He has been associated with George Sykes, vice-president and general manager of the company, for several years.

Thompson in Detroit for Bullard

F. Archer Thompson has been selected to represent the Bullard Machine Tool Co. of Bridgeport, Conn., in Detroit in a sales and engineering capacity. He will locate with the Motch & Merryweather Machinery Co., Majestic Building, which represents the Bullard company in Detroit. Thompson has been chief of the equipment department at the Bullard plant.

Packard Promotes Wilson

J. D. Wilson, who for four years has been assistant to Col. J. G. Vincent, vice-president in charge of engineering of the Packard Motor Car Co., has been made accessory manager of the technical service department of the company. Wilson has been with the Packard organization for twelve years.

Warren Packard with Detroit Branch

Warren Packard, son of W. D. Packard, one of the founders of the Packard Motor Car Co., has been appointed sales promotion and advertising manager of the Packard Detroit branch. He was formerly president of the Packard Engineering Co., and later was identified with the Packard-Cleveland Motor Co.

Henry and Chassagne with Citroen

Engineer Henry, well known as the designer of the Peugeot racing cars which had an unusual run of success between 1912 and 1916, and later designer of the Ballot racing cars, has joined the technical department of the Citroen Co. in Paris. Jean Chassagne, for many years race driver with Sunbeam, has also taken a position with the Citroen concern.

Automotive Exports Set Record in March

Motor Vehicles Shipped from United States and Canada Totalled 20,690

WASHINGTON, May 9—Exports of American cars and trucks were larger in March than in any other month in the history of the automotive industry, according to figures issued by the Automotive Division of the Bureau of Foreign and Domestic Commerce.

Shipments from the United States in March totalled 11,814 passenger cars and 1567 trucks. Adding to this volume the 7309 motor vehicles shipped from Canada the total vehicle exports reach 20,690. The previous high mark was May, 1920, with slightly over 18,000.

The increase in automotive exports since the first of the year has been very pronounced as shown by the following figures:

	Cars	Trucks	Parts
January	10,710	1,721	\$4,365,121
February	14,519	2,136	4,570,700
March	18,240	2,450	4,613,183
Total	43,469	6,307	\$13,549,004

March exports of cars, trucks, accessories and parts were valued at approximately \$20,000,000 as compared with a monthly average in 1922 of \$11,500,000.

Canadian Shipments

WASHINGTON, May 5—Reports received by the Department of Commerce show that Canadian automotive exports in March reached a new record, with an increase of 14 per cent over February shipments.

Passenger cars shipments during March numbered 6426, valued at \$3,218,915 as against 5668 in February and 2983 in March, 1922.

Exports of motor trucks totaled 883, valued at \$301,745 as compared with 438 valued at \$152,587 in February.

Shipments of parts were valued at \$363,978 as against \$196,168 in February.

Australia was the leading market during March, having taken 2801 passenger cars, the largest number ever shipped to any one country from Canada in one month; the United Kingdom followed with 1337, British South Africa with 635, New Zealand with 466, and British India with 291.

The leading truck markets were Australia with 656, British South Africa with 106, and British India with 45.

Belgium Lowers Duty on Cars from France

Latter Country Promises to Re- vise Its Schedule of Tariffs Shortly

PARIS, May 3 (by mail)—After several months spent in direct negotiation, a Franco-Belgian agreement has been reached whereby reduced import duties are applied to French cars imported into Belgium, but Belgian cars imported into France will continue to pay the full French duty of 45 per cent. The Belgian industry has manifested its dissatisfaction with this result and appears to attach little importance to the promise that French automobile import duties will be revised shortly.

Under the new Belgian law the import duty on automobiles is 160 francs per hundred kilos multiplied by the coefficient four. This coefficient has been reduced to 2.6 for complete French cars weighing up to 1980 pounds; 3.1 for weights between 1980 and 3968 pounds and 3.7 for cars above this weight. For chassis the coefficients are the same.

Table That Shows Shipments of Products of the Automotive Industry from the United States in March, 1923, and the Total Exports Made in Nine Months

	Month of March				Nine Months Ending March, 1923			
	1922		1923		1922		1923	
	No.	Value	No.	Value	No.	Value	No.	Value
Automobiles, including chassis.....	5,102	\$4,443,608	13,394	\$9,289,590	27,994	\$24,949,837	74,040	\$53,828,906
Electric trucks and passenger cars.....	40	57,584	16	26,239	74	111,535	230	299,067
Motor trucks and buses, except electric (d).....	371	186,597	1,130	449,350b	2,727a	2,851,223	8,499	3,173,972
Up to 1-ton (inclusive).....	168	247,065	367	426,335b	990b	525,256	2,323	2,806,395
Over 1-ton and up to 2½-ton.....	51	120,630	67	170,380b	409b	628,970	534	1,497,919
Over 2½-ton.....	590	554,292	1,567	1,046,075	100b	244,572	11,356	7,478,286
Total motor trucks and buses, except electric (d).....					4,226	4,250,021		
PASSENGER CARS								
Passenger cars, except electric (d).....	5,187	1,874,678	13,708a	12,164,579	10,354b	3,584,795		
Value up to \$500 (inclusive).....	2,574	1,427,137	2,521	1,718,999b	5,795b	3,077,457	29,259	16,000,690
Value up to \$800 (e).....	1,732	1,902,007	3,895	4,080,152b	3,832b	4,184,464	20,578	21,911,711
Value over \$800 and up to \$2,000.....	166	502,588	211	543,447b	359b	1,161,781	1,663	4,564,357
Value over \$2,000.....	4,472	3,831,732	11,814	8,217,276	23,694	20,568,281	62,454	46,051,533
Total passenger cars, except electric.....								
PARTS, ETC.								
Parts, except engines and tires (*).....	13,589,527	3,596,539	596,230	82,208	22,735,029c	79,316,512c	18,618,812	
Automobile unit assemblies (*).....			21,433,583	4,613,183		1,172,128b	190,009	
Parts and accessories (*).....			123,667	85,179		86,714,687b	13,507,559	
Automobile service appliances n.e.s. (*).....	19	30,651	12	2,345		186,870b	120,231	
Station and warehouse motor trucks (No.).....	125	51,455	49	34,736b	94	118,537	102	66,263
Trailers.....	22	19,600	3	10,818	184b	91,688	597	262,283
Airplanes and seaplanes.....	3,895	3,480	4,561	2,941	41	145,765	29	346,430
Parts of airplanes, except engines and tires(*).....					71,584	365,445	226,539	
BICYCLES, ETC.								
Bicycles and tricycles (No.).....	613	8,970	3,169	24,720		438,472	15,447	124,809
Motorcycles (No.).....	1,573	402,039	2,779	617,164	6,596	1,788,801	13,954	3,294,266
Parts, except tires*.....	272,938	161,539	240,694	149,463b	712,777b	402,187	1,978,030	1,058,159
INTERNAL COMBUSTION ENGINES								
Stationary and portable—								
Diesel and semi-Diesel (No.).....	22	9,424	60	46,689b	43b	29,272	541	252,826
Other stationary and portable engines (No.).....	2,225	287,855	1,954	154,433	11,472	1,864,225c	14,729c	1,781,589
Not over 8 hp. (No.).....			90	61,688			5,837b	451,150
Over 8 hp. (No.).....	3,847	526,177					370b	248,066
Automobile engines (No.).....			55	6,763	12,028	1,734,725c	15,619c	1,910,857
For motor trucks and buses (No.).....			6,300	639,513			78b	16,096
For passenger cars (No.).....			17	9,203			9,053b	1,048,246
Engines for tractors (No.).....	22	6,500	3	445b			41b	17,035
Engines for aircraft (No.).....	605,758	217,726	897,656	318,682b	26b	11,975	66	38,135
Engine accessories and parts for (*).....					607,612	5,098,479	2,116,985	
All other engines and parts of (*).....					3,940,067			

a—July 1 to Dec. 31, 1921. b—Jan. 1 to March 31. c—July 1 to Dec. 31, 1922. d—Includes electrics prior to Jan. 1, 1922. e—Includes cars valued up to \$800 prior to Jan. 1, 1922. *—Pounds.

Sloan Becomes Head of General Motors

Pierre S. duPont Resigns but Will Continue as Chairman of Board

NEW YORK, May 10—Pierre S. duPont has resigned as president and chairman of the executive committee of the General Motors Corp., his successor being Alfred P. Sloan, Jr., vice-president in charge of operations.

DuPont will remain as chairman of the board of the General Motors Corp. and will continue to take an active interest in its affairs. He also holds the corresponding position in E. I. duPont de Nemours & Co., the largest owners of General Motors Corp. common shares. He remains a member of the finance committee and executive committee of General Motors.

The announcement followed the meeting of the board of directors this afternoon, which, after accepting the resignation and installing Sloan as the new president, declared for the second quarter a dividend of 30 cents a share on the common stock, payable June 12 to stock of record May 21; \$1.75 a share on the 7 per cent debentures, \$1.50 a share on both the 6 per cent debenture and 6 per cent preferred, payable Aug. 1 to stock of record July 9.

Tribute Paid to Sloan

The following statement was made by duPont:

At the time of my election to the presidency of General Motors Corporation in December, 1920, it was understood that my term of office would be limited as to duration and, further, that many of the duties of the President would fall upon the shoulders of the vice-presidents of the corporation.

Pursuant to this understanding, Mr. Sloan has assumed the responsibility of directing the operations of the corporation under the general policies laid down by the Executive Committee. The greater part of the successful development of the corporation's operations and the building up of a strong manufacturing and sales organization is due to Mr. Sloan. His elevation to the presidency is a natural and well merited recognition of his untiring and able efforts and successful achievements.

I bespeak for Mr. Sloan a continuation of the loyal and active support that has been accorded him already by the officers and employees of the Corporation, its distributors, dealers, and customers. I greatly admire Mr. Sloan and his business methods, and look upon him as one of the most able partners in the management of General Motors Corporation and their interests.

Sloan Formed United Motors

Sloan, a graduate of the Massachusetts Institute of Technology, was a prominent factor in the development of the Hyatt Roller Bearing Co. until he conceived the idea of bringing together the larger parts and accessory concerns into a holding company similar to General Motors.

He made this possible and the United Motors Corp. was the result, bringing together under one banner the Dayton



Taking on Supplies

One of the interesting phases of the Duesenberg's non-engine stop test of 3155 miles on the Indianapolis Speedway was the taking on of supplies while the car was running at 50 m.p.h. This was accomplished by means of a supply car carrying gasoline, oil and water, beside the relief driver, which ran alongside of the record-breaking Duesenberg until the supplies were put aboard, as shown in the illustration. Because of this unusual stunt it was impossible to record the consumption of gasoline, much fuel being spilled in the transfer.

Engineering Laboratories Co., Dayton, Ohio; Remy Electric Co., Anderson, Ind.; Hyatt Roller Bearing Co., Newark, N. J.; New Departure Manufacturing Co., Bristol, Conn.; Harrison Radiator Corp., Lockport, N. Y.; Jaxon Steel Products Co., Jackson, Mich.; Klaxon Co., Bloomfield, N. J., and several others. Sloan was elected president of United Motors.

In 1918 the United Motors Corp. was taken over by the General Motors Corp., which was then headed by W. C. Durant, Sloan being appointed vice-president in charge of the accessories and parts group. When Du Pont succeeded Durant, Sloan was made vice-president in charge of operations.

Majestic Tire Purchased by International Rubber

INDIANAPOLIS, May 8—Purchase of the assets of the Majestic Tire & Rubber Co. of this city, which went into the hands of a receiver last August, has been announced by John D. Wiggins of Anderson, Ind., president of the International Rubber Co. of that city. The cash consideration was stated to be \$125,000, and it was said that the plant would be put into operation at once under the name of the International Tire & Rubber Co.

Wiggins, S. T. Davis and Herbert L. Lantz of the International Rubber Co. and Park G. Haynes and Otto J. Feucht of the credit department of the Fletcher American Bank of this city are understood to be the purchasers.

Lantz will be manager of the factory, which has a daily capacity of 600 tires.

The sale awaits approval by the court.

Company Will Handle Steel Wheel Patents

License to Carry on Manufacture Will Be Granted by New Steel Wheel Corp.

DETROIT, May 7—Steel Wheel Corp. has filed papers of incorporation at Lansing with capitalization of \$10,000, and 100,000 no par value shares. The company is organized by H. F. Harper and B. S. Gier of the Motor Wheel Corp. C. H. L. Flintermann, former president of the Detroit Steel Wheel Co., and president of the Detroit Pressed Steel Co., and R. H. Ripley of Chicago.

According to a statement by S. Gier, secretary and treasurer of the new corporation, the company has exclusive right to license the manufacture and sale of steel wheels under the Putnam, Forsythe, Williams and Winter patents, and some others, and such license will be granted to responsible manufacturers. The company will not manufacture under its own name.

The company was organized primarily, Gier said, to secure to manufacturers the privileges of certain conflicting patents, thereby enabling such manufacturers to develop the steel wheel industry on a safe and sound basis. All of the stock of the Steel Wheel Corp. is owned and controlled by the Motor Wheel Corp., the Detroit Pressed Steel Co. and American Steel Foundries, Chicago.

Makers and Operators of Taxicabs Organize

CHICAGO, May 7—Taxicab operators and manufacturers of cabs and cab parts and accessories, at a recent meeting in Chicago, organized the Cab Industries Association, a national organization devoted to the development and progress of the taxicab business.

Officers were elected as follows: President, G. M. Barnard, Town Cab Co., Chicago; first vice-president, W. E. Phelps, Barley Motor Car Co., Kalamazoo, Mich.; second vice-president, B. D. DeWeese, Columbia Axle Co., Cleveland; third vice-president, E. M. Bahr, Checker Cab Co., Milwaukee; secretary, treasurer and general manager, Mason Barlow. It is proposed to hold a national convention and taxicab show in Chicago.

Suits to Recover \$11,331 Filed Against National

CHICAGO, May 7—Seven suits for claims aggregating \$11,331 have been filed in the Chicago Municipal Court against the National Motors Corp.

The claims are for salaries, art work in preparation of catalogs announcing the new line of National cars, and work in preparation of models of the new line for exhibition at the New York and Chicago automobile shows.

Great Lakes Doubles Shipping Facilities

There Is Enough Automotive Business, Moreover, to Warrant Additional Boats

(Continued from page 1044)

lake shipping will have its most visible effect on driveaways, these being changed to a combination of boat and driveaway delivery to points easily reached from the major lake ports. There will be some slackening in business for the railroads but the industry will continue to use, for the present at least, all the automobile cars and covered freight cars it can get.

For a considerable time past the industry has been compelled to do a large part of its shipping in railroad flat cars or gondolas. Recently the number of these required has been cut in half through the greater availability of the covered cars, but the April figures show that a large percentage of flat cars per day were still being loaded. Traffic managers find the railroad situation better all the time but a form of embargo still is effective in Detroit to prevent congestion in the terminals.

Boat Rates Below Rail

No encouragement is required by factories to ship by boat. Not only are rates approximately 20 per cent lower than railroad freight, but cars are delivered in better condition. Dealers prefer cars shipped by boat, because of the latter fact. No loading or unloading difficulties are experienced and some time-saving can be effected over railroad shipments under present conditions.

Factory executives frown on reported possibilities of a rate-war among shipping companies, because competition on rates might result in driving some companies out of business, and the industry needs all the facilities available. Traffic managers declare they will not award business on a rate basis and will discourage companies seeking it that way.

Regular Schedule Possible

All water shipping from Detroit to New York by way of the New York State barge canal may be put on a regular schedule this year if dock facilities are made available by the city. Two companies have the matter under consideration, one to operate tow-barges over the entire distance, the other to operate self-propelled barges. Both would make deliveries at intermediate points between Buffalo and New York. Several all-water shipments were made to New York last year, but these involved transshipment from boat to barge at Buffalo. The formation of the all-barge route this year is possible, but will not take place for another year.

Canada Steamship Lines, Ltd., is undertaking to develop a large direct

automobile export business out of Detroit, shipping through the Welland Canal to the St. Lawrence and then transshipping at Montreal to ocean-going vessels. Tests made last year were found entirely satisfactory, and export departments using the service have declared themselves preparing to take full advantage of it during the present year.

Under this shipping plan factories are given through bills of lading, thus avoiding considerable detail in the handling of shipments first by railroad to seaport, and then the arranging for ocean transportation.

Coordination Plans Take Step Forward

(Continued from page 1044)

form of improved highways built at the expense of the taxpayers.

Store door delivery was discussed and almost unanimously approved at a session of the Domestic Distribution group. W. J. L. Banham, traffic manager of the Otis Elevator Co., outlined the methods in use in other countries and advocated their adoption here. He declared the motor truck should reduce the present antiquated methods in use at terminals for the collection and delivery of freight.

J. Walter Drake, chairman of the foreign trade committee of the National Automobile Chamber of Commerce, read an interesting paper on "Manufactures in Export Trade" before the foreign commerce group. He has just returned from Europe.

A. J. Brosseau, president of Mack Trucks, Inc., was reelected a director of the Chamber and presided at a session of the transportation group.

Monarch Prices Advance \$100 to \$250 on July 1

WATERTOWN, WIS., May 8—Monarch Tractors, Inc., announces that the price of its tractors will be advanced July 1, the increases ranging from \$100 to \$250. The higher cost of materials used in the construction of the tractor makes this increase necessary, it is stated. The following is the price schedule:

Model	Present Prices	Prices July 1
20-30	\$3,700	\$3,800
4-40	4,200	4,350
6-60	5,500	5,750

Hanson Reduces List on Full Line of Cars

ATLANTA, May 8—The Hanson Motor Co. has announced a price reduction amounting to \$200 on the open models and \$390 on the sedan. The two-passenger coupé has been discontinued. The following is the latest list:

	Old Price	New Price
2-Passenger roadster.....	\$1,595	\$1,395
5-passenger phaeton.....	1,595	1,395
Sport phaeton.....	1,695	1,495
5-passenger sedan.....	2,585	2,195

Willys-Overland Cuts Its Debt to \$6,943,000

In Two Payments Since March 31, It Has Made Reduction from \$14,059,000

TOLEDO, May 8—The showing being made by the Willys-Overland Co. was indicated at the annual meeting of stockholders here today, when it was reported that since March 31 two payments have been made, reducing the outstanding bonded indebtedness from \$14,059,000 to \$6,943,000.

Much business was transacted at the meeting. The stockholders authorized a \$15,000,000 bond issue, not to be disposed of for some time, according to present plans; reelected all of the directors, made provision for the duties and authority of the chairman of the board of directors and changed regulations so as to authorize and consent to the sale of assets of the company not necessary to operations in the making of automobiles.

No provision was made to elect successors on the board to Elisha Walker, New York, and George Stephens, Moline, Ill., who resigned some time ago. The board will remain with eleven members.

Henry Thompson, Toledo, has been acting chairman of the board and will remain in that office. Other officials will continue as heretofore.

\$2,729,468 Earned in Quarter

The statement for the quarter ended March 31 shows estimated earnings of \$2,729,468. Cars sold from the factory during that period totaled 39,030. April sales exceeded 20,000 cars and the month of May, President John N. Willys' report shows, will break all records.

Production at the plant during the month will average 1000 cars a day.

Garford Truck Increases Lists from \$185 to \$550

LIMA, OHIO, May 8—Increases in price ranging from \$185 on the lighter models to \$550 on the heavier have been announced by the Garford Motor Truck Co. The only model that has not been increased in price is Model 15 1-ton chassis, which still lists at \$1,590. The latest prices on the bus chassis were also given out by the Garford company and are as follows:

Model	Price
725, 25-passenger.....	\$3,250
51D, 25-29-passenger.....	4,350

The new motor truck chassis schedule follows:

Model	Old Price	New Price
25B, 1½-ton.....	\$2,190	\$2,375
70H, 2½-ton.....	2,750	3,250
77D, 4-ton.....	3,750	4,200
68D, 5-ton.....	4,500	5,000
150A, 7½-ton.....	5,200	5,750

Injunction Awarded Maker of Moto Meter

In Decision, Court Tells Value of
Device Perfected by Harrison
H. Boyce

NEW YORK, May 8—A permanent injunction against the Pyrene Manufacturing Co. of Newark, N. J., has been granted by Judge Bodine of the United States District Court, sitting at Newark, in the suit brought by Harrison H. Boyce and the Moto Meter Co., Inc., which claimed infringement of United States patent No. 1,090,776, involving the Moto Meter.

Convinced Public of Value

Judge Bodine went into the case deeply and his decision tells of the uphill fight Boyce had to make to convince the motoring public that his device was not an ornament and that it was an engine heat-indicator and not a thermometer. He describes the device as follows:

The Boyce device does more than disclose the water temperature. It is not placed in the water, but is placed above the water at a point where the radiator is cooler than the water until steam forms. As soon as steam forms the air space becomes hot and the Boyce Moto Meter quickly jumps forward.

Everything is arranged so as to accentuate a quick jump in the temperature of the air space above the water, when steam is formed. In this function there was novelty and in this function there was utility, and in this function lies the basis for the commercial success which Boyce has earned.

Continuing, the judge said:

If the Boyce patent is valid, the defendant is a willful infringer. The defendant uses an instrument formed with a casing substantially identical with the corresponding part of the plaintiff's instrument and procured from the same manufacturer. Also similar crystals, retaining rings and dial plates are used. Many of the parts are actually interchangeable, and this similarity is not a matter of mere coincidence.

Defendant Told of Patents

The defendant started in business after its president had a long talk with the plaintiff's sales manager. He was told of the patent, was given a copy also of the decision in the case of the Boyce Moto Meter vs. the Stewart-Warner Co. (Circuit Court of Appeals for the Second Circuit), 226 Fed. 118. In that case the patent was sustained. No motion was made for a stay of the preliminary injunction granted in the case until after final hearing.

The slavish imitation by the defendant and the purchase of parts from the same manufacturer who supplies the plaintiff's parts, and the decision in the Stewart-Warner case—an instrument with a movable indicating hand rather than an indicating tube—make it necessary to consider only the question of the invalidity of the patent.

Judge Bodine reviewed the testimony of those who had used thermometers to study the operation and design of the water-cooling of a car, notably Frederick Purdy, former chief engineer of the

Thomas B. Jeffery Co., maker of the Rambler car, but his interpretation of this testimony was that those who had used thermometers did not have the same conception of the advantages of a heat-indicating device as Boyce did.

Purdy's thermometer, he said, required constant watching; there was no jump upward. It was placed in the water used in the cooling system and would indicate nothing except to the trained engineer using it for experimental purposes.

"There is nothing in the case to indicate that any of the 170 manufacturers of automobiles now using the Boyce Moto Meter, or anyone else, ever realized the utility and advantage of anything like the device until Boyce placed his meter upon the market," said the Court.

Winding up his decision, Judge Bodine said:

The keynote of all the decisions (referred to previously by the Court) is the extent of the benefit conferred upon mankind. Where the Court has determined that this benefit is valuable and extensive it will, we think, be difficult to find a well-considered case where the patent has been overthrown on the ground of nonpatentability.

There can be no doubt but what Boyce secured a valid patent. The preliminary injunction will be made permanent.

Executives of the Pyrene Manufacturing Co. had no comment to make on the decision other than to state that the case undoubtedly will be appealed.

Maxwell Netted \$1,026,250 First Quarter This Year

DETROIT, May 8—Net earnings of the Maxwell Motor Corp. for the quarter ending March 31, after taxes, depreciation and other charges, totaled \$1,026,250, compared with a loss of approximately \$600,000 in the first quarter of last year. Total sales in the first three months of this year were \$12,414,148.

Current net assets shown, as of March 31, totaled \$18,211,776 including cash of \$3,297,644 and bank acceptances and securities of \$2,044,255. Current liabilities were \$7,023,303. Included in current liabilities are series B notes of \$2,103,533 due June 1 of this year. The report shows no bank loans.

In the report of Maxwell-Chalmers contained in AUTOMOTIVE INDUSTRIES of April 19, it was stated that plans for the current year are based on the sale of 6000 Maxwell and 14,000 Chalmers cars. Instead of 6000 Maxwells, the figure should have been 60,000. Yearly sales of the two cars for the year 1922 exceeded \$48,000,000 in value.

FORD WEEKLY OUTPUT

DETROIT, May 9—Ford Motor Co. production for the week ending May 8 shows a total of 39,053 cars and trucks in domestic plants, an increase of 192 over the best previous week. A new daily high mark of 6590 was made on May 4 a gain of seventeen over the best previous day, April 17. Tractor production for the week was 2578

Market Overcrowded, Banker Said in 1903

For That Reason H. M. Jewett
Declined to Acquire Interest
in Ford Company

DETROIT, May 8—Speaking at the semi-annual meeting of the Association of National Advertisers, H. M. Jewett, president of the Paige-Detroit Motor Car Co., recalled a time in 1903 when he said he could have had a quarter interest in the Ford Motor Co., as part payment of a debt of \$3,950, but declined on the advice of a banker who said the car market at that time was overcrowded. There were probably fewer than 1000 cars in the country, Jewett said.

The development of the automobile to its present position was just as much due to advertising as to the development of mechanical superiority, Jewett said. When automobiles were new the world needed to be told about them and thus the advertising of the industry became a matter of national importance. As it stands today the industry is in a strong position because of the need for transportation, he said, and it will continue to be strong while transportation is an essential of life.

E. St. Elmo Lewis, first president and founder of the association, recalled the days of 1910 when the organization came into being. Harry Tipper, business manager of the association and business manager of AUTOMOTIVE INDUSTRIES, spoke on advertising and selling, and Douglas Mallock, author, gave several recitations.

\$42,621,724 Reported as Durant Earnings

(Continued from page 1047)

The Durant Motor Co. of Indiana, located at Muncie and manufacturing Durant Six and Princeton cars with a capacity of 60 cars a day, is under the direction of the holding corporation and the compensation is 60 per cent of the net profits.

The Locomobile Co. of America, Inc., is described as an operating and holding company, manufacturing Locomobiles at Bridgeport, Conn., and in addition owning and operating its plant at Long Island City, where it manufactures the Flint car. Locomobile controls by contract the supervision and management of the Flint Motor Co., of Flint, Mich., receiving 50 per cent of the net profits. It controls by stock ownership the supervision and management of the Mason Motor Truck Co. of Flint, Mich. Against all of its properties and equities the Locomobile Co. of America, Inc., has issued 600,000 shares of no par value common stock, all of which is owned by Durant Motors, Inc.

Durant Motors, Limited, of London, England, controls the sale of Durant products in the British Isles.

FINANCIAL NOTES

India Tire & Rubber Co. of Akron reports that the first four months of 1923 showed an increase of 30 per cent in new accounts, while March shipments were 33½ per cent larger in units than those of any previous month in the history of the company. While spring dating business for the current year amounted to approximately \$1,000,000, the company was asked to renew less than \$2,000,000 of April 10 acceptances.

A. O. Smith Corp. will issue a call for the \$5,000,000 6 per cent notes due Oct. 1, 1924. All of these notes now become due and payable at the office of the first Wisconsin Trust Co., Milwaukee, June 4. Recently the corporation issued \$5,000,000 in first mortgage bonds, the funds from which will be used to pay off the issue called and to provide for business expansion.

Hood Rubber Co. will hold its annual meeting May 17, when stockholders will be asked to authorize the reduction of the capital stock of the company by the surrender and cancellation of 1500 shares of the new preferred stock acquired by the company and set aside for retirement in accordance with the provisions under which the stock was issued.

Hayes Wheel Co.'s quarterly report shows net earnings of \$482,536 and gross sales of \$4,553,424. The income account for 1922 indicates net sales of \$13,218,305, as against \$11,535,534 in 1921, and net profits for the year of \$1,158,601 after taxes, as against \$502,708 in 1921. The company is producing at the rate of 20,000 wheels a day.

White Motor Co. has declared the regular quarterly dividend of \$1 a share, payable June 30 to holders of record June 20. At the annual meeting of the stockholders all directors and officers were re-elected.

Cole Motor Car Co. directors have declared a cash dividend of \$5 a share to all stockholders of record May 1. This is the second dividend that has been declared during the past six months.

Los Angeles Bus Plans Defeated by Motorists

LOS ANGELES, Cal., May 5—Returns from Tuesday's election show that the proposition to operate motor buses in this city has been defeated by a large margin. The defeat was due not so much to railroad opposition as to the belief by the public that motor buses would increase already existing serious traffic congestion. Thousands of motorists voted against the proposition because they did not like the idea of having to drive behind buses on narrow streets.

The proposition was backed by Eastern capitalists who sought to operate 125 double-deck buses, and was opposed by the local electric railways.

During the campaign the latter promised the public a vastly improved service through consolidation, a subway and Union station if the bus referendum was defeated. The applicants for permission to operate the buses offered a percentage of the gross income to the city.

NEW M. A. M. A. DIRECTORS

NEW YORK, May 9—Directors of the Motor and Accessory Manufacturers

Association met here today to elect two members of the board to fill the place of G. W. Yeoman and Fred Glover, resigned. The men chosen were Eugene B. Clark of the Clark Equipment Co. and E. P. Chalfant of the Gill Piston Ring Co.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

Outstanding development last week was the decline in prices of certain raw materials. During the last two weeks wheat has dropped 10 to 12 cents per bushel, and cotton within a week declined \$10 a bale. Rubber has fallen off nearly four cents a pound during April and copper, oils and gasoline are down considerably.

Bradstreet's index number for April declined two points and for commodities as a whole there were four declines to every advance last week. Farmers' buying as shown by mail order sales continues strong. For four months the sales figures are 40 per cent higher than last year. The sales of farm tractors are the largest reported for several years.

Most of the large industries continue to operate at high speed but limited in some cases by labor and material shortages or transportation difficulties. Iron and steel, automobile manufacturing, implement making and building show the greatest activity, with textile production at a record rate. Pig iron production for April, 3,547,551 gross tons, is the highest monthly output ever reported. Four months' production is 80 per cent above last year and about 10 per cent above 1920.

The interest rate on commercial paper remains unchanged at 5 to 5½ per cent.

Commercial figures in April involving liabilities of \$52,491,941 were reported. Liabilities in April a year ago amounted to \$73,058,637. Both in number and amount of liabilities the insolvencies to date this year are much greater than in either 1918, 1919 or 1920.

Business activity as measured by bank checks debited continues its advance. For the week ended May 2, in 243 centers reporting to the Federal Reserve, debits, which included month-end settlements, totaled \$11,051,000,000, the largest total since the week ended Jan. 3, which included end-of-the-year settlements.

Dissolution Authorized for Weekes-Hoffman Co.

SYRACUSE, N. Y., May 8—Formal dissolution of the Weekes-Hoffman Co., manufacturer of straight bevel gears in this city, has been ordered by Supreme Court Justice Ernest I. Edgecomb.

The company, organized in 1919 by the expansion of the John M. Weekes Co., has assets of \$187,147 and liabilities of \$306,033. It has a plant valued at \$115,000.

Firestone Promoting New Rubber Company

Understood He Will Attempt to
Furnish Supplies from
Philippines

NEW YORK, May 9—Harvey S. Firestone, president of the Firestone Tire & Rubber Co., is promoting, it is understood, a company which will attempt to provide the United States with an independent rubber supply from plantations in the Philippines. A considerable number of the smaller tire manufacturing companies are expected to be associated with him in the enterprise but none of the largest companies will be invited to take stock in the corporation.

Firestone is not in sympathy with the position taken by the Rubber Association of America in relation to the British colonial administration's measures to restrict exportation of crude rubber, and he believes the situation is critical. He has sought the aid of governmental agencies to have representations made to the British government in opposition to artificial and arbitrary regulation of the supply. The Rubber Association is relying for relief upon negotiations with the British rubber industry pending the development of an American supply.

No Crisis, Says Seiberling

F. A. Seiberling, former head of the Goodyear company and now president of the corporation which bears his name, took sharp issue with Firestone at a session today of the Foreign Trade Department of the United States Chamber of Commerce. He declared emphatically that no crisis now exists and that the situation is not in any sense comparable to that which prevailed before the collapse in 1920 when the price of crude dropped from 50 cents to 15 cents a pound almost overnight.

He said that when the war began the British government declared an embargo on rubber exports but that American manufacturers succeeded in having it lifted. Had they not done so there would have been a famine in this country. He declared the Rubber Association was 100 per cent against the present British policy and realized that provision must be made for an American supply. He cited the survey which has been undertaken by the Government of the possibility of growing rubber in the Philippines and South America.

Firestone Sees Hope in Islands

Seiberling, who was scheduled for an address on the rubber situation, was delayed in arriving at the meeting because his train was late, and Firestone was invited to discuss the subject pending his arrival. He outlined his views on the seriousness of the situation, which he considers critical, and declared the Philippines could produce all the rubber America needs if sufficient capital were invested.

Good Weather Helps Trade in New York

May Is Making Up for Falling Off in Sales Felt Latter Part of April

NEW YORK, May 10—More detailed information than was obtainable a week ago on passenger car sales in the metropolitan territory shows that the last two weeks of April were disappointing as compared with the record set up during the first half of the month. The first ten days of May, however, are making up for the late April drop and all indications point to a big month.

The weather in May has been decidedly favorable and so far sales have been in keeping with it. Saturday, May 5, brought more people to the Broadway salesrooms than at any time in several years, and Monday was the biggest day for prospects in the establishments, particularly in Brooklyn and New York.

The only cloud in the sky for automobile merchants in the metropolitan territory is a sluggishness in demand for open cars. Virtually all cars in the first and second ranks of popularity are far oversold on these models, but some distributors and branches have more open cars on hand, or on the way from factories, than they can see immediate sales for. They expect, however, that with their open car orders held down somewhat during May and June sales in these two months will take care of the accumulation of these models in April.

New Process for Making Iron Castings Developed

CLEVELAND, May 7—The development of a new system of making iron castings from "long-life molds" was disclosed by Dr. Richard Moldenke of Watchung, N. J., an authority on iron foundry methods, in a paper read before the American Foundrymen's convention here. This invention was developed by the Holley Carburetor Co. of Detroit, and, according to Dr. Moldenke, marks a long step forward.

It is said that this type of mold will produce six two-pound castings per minute. Dr. Moldenke claims that the new method allows one man to pour 400 castings per hour by standing above with a revolving table on which twelve of these castings are placed. With the old method of sand casting it took eight times as many hours to produce any given quantity of castings as it takes by the new method.

CHARLES E. SHELDON DIES

AKRON, OHIO, May 7—Charles E. Sheldon, chairman of the board of directors of the Whitman & Barnes Manufacturing Co., maker of twist drills and reamers, is dead, aged seventy-three, following a month's illness. Mr. Sheldon

started with the Whitman & Miles Manufacturing Co. of Fitchburg, Mass., in 1867.

Later the company was consolidated with other plants, becoming the Whitman & Barnes Manufacturing Co., Mr. Sheldon serving as superintendent of the Fitchburg works in 1872. In 1877 he was sent to Akron to take charge of the works here. From that time on his rise was rapid, and in 1902 he was elected president. He was chosen chairman of the board of directors in 1915.

INDUSTRIAL NOTES

Columbus Tire & Rubber Co., Columbus, Ohio, has increased its capacity 100 per cent over a year ago through the installation of a 50-foot heater and new molds and forms. The output of the plant the latter part of April was 375 tires and 450 tubes daily. This will be increased still further in the course of 60 days by additional equipment.

S. F. Bowser & Co., Inc., Fort Wayne, Ind., manufacturer of tanks and pumps, reports that business is now running at the rate of better than \$1,000,000 a month and that March shipments were more than \$1,100,000. The first four months of the year were the best the company has enjoyed in its history for that period.

American Bosch Magneto Co. reports April billings from the Springfield and Cambridge plants of approximately \$1,100,000. Releases received for April and May indicate capacity operations on starting and lighting business, while additional orders have been received in the last month for 15,000 magnetos.

Stewart-Warner Speedometer Corp. reports that April sales were 84 per cent better than in April, 1922, and that the sales for the first four months of 1923 were 80 per cent over the corresponding period in 1922.

\$55 Estimated as Net Profit on Every Ford

NEW YORK, May 9—An analysis of the financial statement filed in Massachusetts by the Ford Motor Co., made by the *Wall Street Journal*, has resulted in the statement that Ford makes a net profit of \$55 per car. The gross profit is \$77, but allowance is made for depreciation and other reserves. Added to this, there is a profit of \$13 on parts, leaving \$64 manufacturing profit.

At \$55 profit the total net profits amounted to \$84,348,605 on the 1,533,611 motor vehicles built by Ford in the year ending Feb. 28, 1923, while the profit from the sale of parts amounted to \$19,936,943.

SCHWARZ WHEEL PATENT SOLD

PHILADELPHIA, May 1 — The Schwarz Wheel Co., which has manufactured the interlocked spoke type of wheel under the Schwarz patent since 1904, has sold the patent to Crane-McMahon of St. Mary's, Ohio, which will continue the manufacture of the wheel. S. Vance Lovenstein, president and general manager of the Schwarz Wheel Co., will join the Eugene McGuckin Co., advertising agency, on June 1 as vice-president.

METAL MARKETS

The all-important modification that has taken place in the steel market's form is the steadily widening gap between current mill output and current absorption of steel by ultimate fabricating consumers. The excess of steel production over actual consumption can only be sensed, definite and comprehensive reports being, of course, unavailable. It is well known, however, that some of the leading steel consuming industries are working up much less steel than is at their disposal and than their plant facilities could digest. While the recent suspension of shipments of cold-rolled strip steel by the leading builder of low-priced passenger motor cars has come in for much attention, this was by no means the only instance of a consumer indicated that steel is not wanted as eagerly as it was a few weeks ago.

The railway equipment industry is known to be operating at a much slower pace than it was in March. Top-heaviness of labor costs has put considerable of a damper on new building projects, and in not a few lines has there been a seasonal recession in activities. For the sake of clarity, it is necessary to emphasize that the present excess of steel output over actual steel absorption may be short-lived. A very natural factor to be figured with is that the steel industry's rate of operations is at its peak just now, and that numerous circumstances will combine to lower it, the nearer the summer draws.

Amid the prevailing scarcity of common labor the lessening of productive efficiency during the heated term will be augmented by a considerable loss in man power to agriculture and kindred outdoor employment. If steel producers should notice over the next few weeks a more marked loss of buying appetite by consumers than is already in evidence, they will adjust their operating schedules so that the orders which they now have on their books will keep their mills in running order for a longer period than under the top-notch pressure of the last few months. There is a limit downward in the rate of mill operation beyond which it becomes highly unprofitable to continue, but the present activity which is the highest on record is such that it affords ample leeway for orderly whittling down.

While it is freely admitted that the crest in 1923 steel demand and output has in all probability been passed and that a slow descent from the upper ridge is now under way, disappointment is apt to be in store for those who imagine that the easier tone that has set in will speedily be translated into downward price changes. Hardly two months have passed since buyers fell over one another in their scramble for premium steel. Premiums have disappeared. It is only a few weeks ago that many mills would turn away business at going prices for no other reason than to have their order books in such shape as to enable them to take advantage of what was generally expected to be a much higher premium market.

Pig Iron.—Furnaces are beginning to show signs of overproduction. Current quotations are largely nominal.

Aluminum.—The dent made into world output by the non-productiveness of German works as the result of the Ruhr occupation continues to be a tremendous prop to the market which is quotably unchanged.

Copper.—Consumers are slow in taking hold of the market, but producers are not pressing them at the sacrifice of price. Some speculative holders, however, have tired and are liquidating their holdings.

Calendar

SHOWS

Sept. 1-7—Chicago, National Transportation Exhibition, under the auspices of Motor Truck Industries, Coliseum and Annex.

Nov. 4-10—New York, First Automobile Exposition of the Foreign Automotive Association, Hotel Astor.

FOREIGN SHOWS

May 9-June 12—Gothenburg, Sweden, International Automobile Exhibition, Sponsored by the Royal Automobile Club of Sweden.

Oct. 4-14—Paris, Passenger Cars, Bicycles, Motorcycles and Accessories, Grand Palais.

Oct. 15-20—London, Motorcycle Show, Olympia.

Oct. 24-Nov. 2—Paris, Trucks,

Agricultural Tractors, etc., Grand Palais.

Nov. 1-15—Buenos Aires, Annual Automobile Exposition, under the direction of the Automovil Club Argentino.

Nov. 2-10—London, Automobile Show, Olympia.

Nov. 22-Dec. 1—London, Motor Transport Exhibition.

RACES

May 30—Indianapolis, Eleventh Annual 500-mile International Sweepstakes.

July 2—Tours, French Grand Prix 500-mile race.

Oct. 28—Barcelona, Spain, Grand Prix for vehicles of 1500 c.c.; Nov. 1, International Grand Prix for cycle cars of 1100—Nov. 4, International Grand Prix for two liter.

CONVENTIONS

May 15-16—Detroit, Spring Convention of the Service Managers' Division of the National Automobile Chamber of Commerce, General Motors Building.

Oct. 24-26—Cleveland, Thirtieth Annual Convention of the National Association of Farm Equipment Manufacturers, Hotel Statler.

Nov. 12-17—Chicago, Annual Business Exhibit and Convention of the Automotive Equipment Association, Coliseum.

S. A. E. MEETINGS

Metropolitan Section

May 17—Speaker, F. P. Gilligan, Secretary, Henry Souther Engineering Co., Subject, Metallic Materials for Automotive Work.

Other S. A. E. Meetings

June 19-23—Summer Meeting of the S. A. E.—Spring Lake, N. J.

Oct. 25-26—Production Meeting of the S. A. E.—Cleveland.

Jan. 1924—Annual Meeting of the S. A. E.—Detroit.

MEETINGS

June 14-15—Bethlehem, Pa., Eastern Sectional Meeting of the American Society for Steel Treating, Hotel Reservations made through George C. Lilly, Superintendent of Heat Treatment, Bethlehem Steel Co., Bethlehem.

June 25-July 1—Dixville Notch, N. H., Summer Meeting of the Automotive Equipment Association.

University Conducts Tests for Industry

ANN ARBOR, MICH., May 8—That universities must soon expand to supply service to manufacturers and business men as State agricultural colleges do for the farmer is forecast in the step taken by the University of Michigan where a department of extension service for manufacturers and technical and civic interests is now in full operation under State sanction.

The department is in charge of Prof. A. E. White, who has rapidly expanded the scope of the department to include the solution of problems from testing automobile parts to searching for recovering wasted by-products of the steel industry.

Automobile corporations in Detroit, steel corporations in Pittsburgh and many other industries have availed themselves of this new service which consists of trained specialists, graduate students working under direction of authorities on the subject at hand, backed by one of the largest research libraries in the country.

Modern Research Laboratory

The university is already equipped with one of the most modern research laboratories and soon will add a physics laboratory sunk 30 ft. in the ground to avoid vibration. This laboratory is now under construction. In the laboratories now in use tests for more durable paint finishes for automobiles have been conducted, the hottest electric fire ever developed has been produced, chemical, radio, and other tests conducted.

The results of all tests requested by manufacturers are carefully tabulated in full and returned to the company making the request. This information is not secret. The one requirement is that it be always open to the public and thus it helps all industry. For instance, the automobile paint tests are made for a group of Detroit corporations and the

results will affect every manufacturer in the United States, it is predicted.

Under the University of Michigan plan, the work is done at cost. The university furnishes the experts, the libraries, the laboratories and the time; the manufacturer furnishes materials and funds for needed supplies.

Prof. White is responsible to the dean of the engineering college for his department and is assisted by two committees: Administrative, consisting of deans of the university; and an advisory board, appointed by President Marion L. Burton upon recommendation of the Michigan Manufacturers' Association.

The present advisory board includes such men as Roy D. Chapin of the Hudson Motor Car Co.; J. N. Dwyer, Detroit stove manufacturer; R. W. Irwin, Grand Rapids furniture maker; H. M. Leland of Detroit and M. M. Duncan, Ishpeming.

Shipments by Federal Double 1922 Quarter

DETROIT, May 8—Shipments of Federal trucks for the first quarter this year were 904 vehicles as against 424 for the same quarter last year. Gross business for the quarter was \$1,876,015, as compared with \$857,170 a year ago. Orders total 1182 as against 503.

Unfilled orders at the end of the quarter were 367, as contrasted to 140. At the present rate of earnings net profit for the year will aggregate \$1,200,000, M. L. Pulcher, vice-president and general manager, states, or three times the net in 1922.

The company reports a large gain in dealers since the first of the year.

RUBBER MEETING OMITTED

CHICAGO, May 8—The May meeting of the Midwest Rubber Manufacturers' Association, which was to have been held May 15 at Hannibal, Mo., will be omitted. The next meeting will be held June 12 at the Morrison Hotel, Chicago.

City Planner Wants Parking Time Limit

BALTIMORE, May 7—The automobile feature of the National City Planning Conference, held here last week, was the paper of Hugh E. Young, engineer of the Chicago Plan Commission, discussion of which was led by John C. Long of the National Automobile Chamber of Commerce.

Young held that parking should be prohibited on all streets in the central business district unless there is ample room for two moving lines of traffic between the street car tracks and the curb. He favored limiting parking to thirty minutes when it can be permitted as this time limit would treble the number of vehicles that can reach business property, a condition obviously beneficial to both business man and automobile owner.

It was suggested that parking space be provided in the central business district by means of multiple floor garages, preferably on the ramp design, when other suitable spaces are not available or appear inadequate to meet future needs.

Garage Building Urged

Private garages or municipally owned and operated public garages should be provided for half-day and day storage in areas immediately outside and within five to ten minutes' walk of the heart of the central business district. Construction of garages in connection with new building development in the residential and sub-center districts should be encouraged.

Young favored widening streets in congested apartment districts for four lines of vehicles, two standing and two moving. Parking on business streets and main thoroughfares in sub-centers and congested resident sections should be limited to thirty minutes and double rows of parking should be prohibited, he stated.